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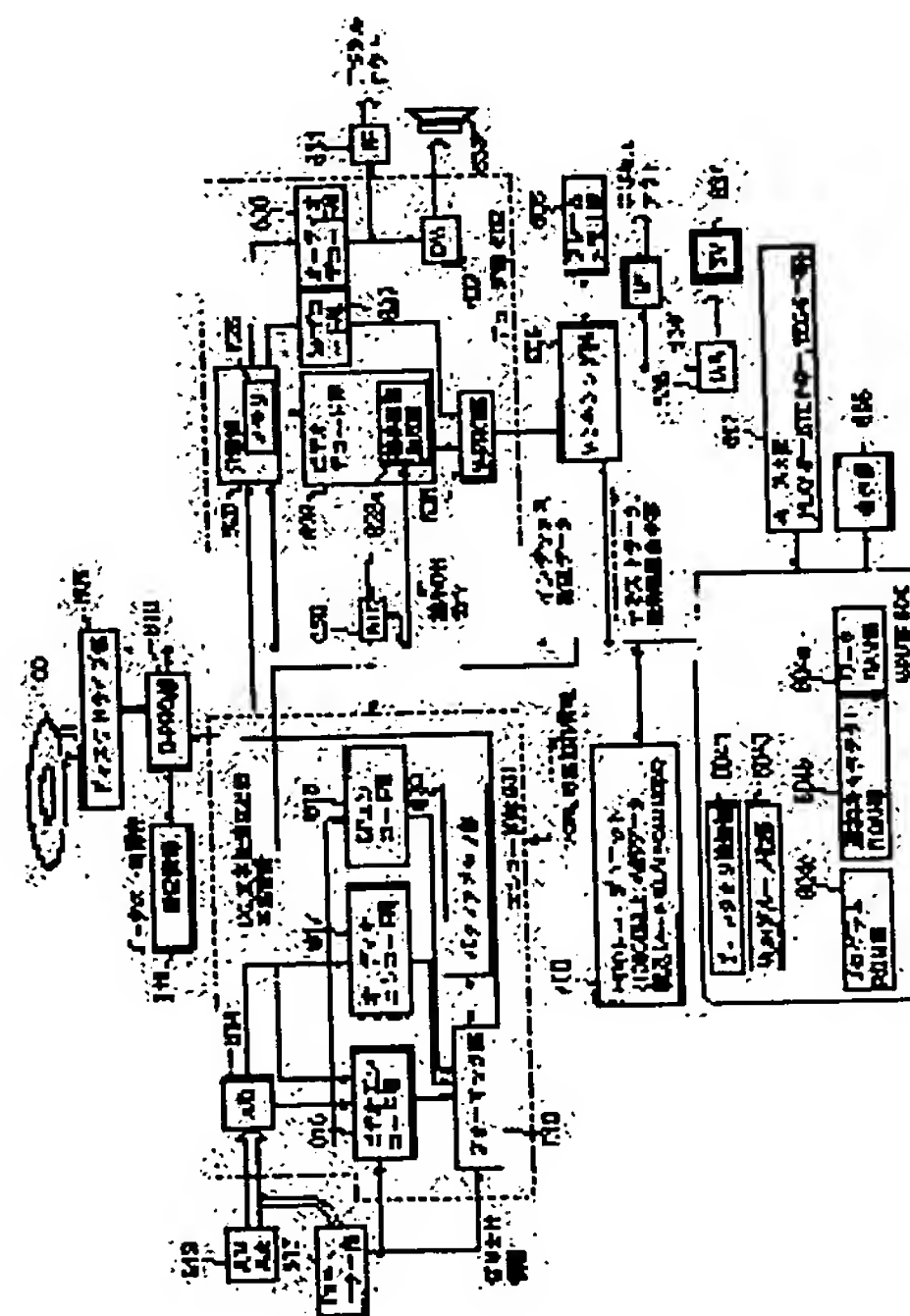
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(54) DIGITAL VIDEO INFORMATION UNIT WITH STILL PICTURE CONTINUOUSLY CAPTURING FUNCTION

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a digital video information unit having a still picture continuously capturing function that can continuously capture still pictures from a video signal without the need for sequentially selecting/setting one by one captured still picture by a user.

SOLUTION: The digital video information unit with the still picture continuously capturing function consists of a key entry section (607) that designates a still picture continuously capturing mode, a frame change detection section (604) for detecting that video contents of a captured frame differ from those of a preceding frame on the basis of a received video signal after the shift to the still picture continuously capturing mode, an encoder section (601) for compressing frame data captured on the basis of the information from the detection section into I pictures in compliance with the MPEG to generate a pack structure designated by the RTR(Real Time Recording)-DVD standards, and a reproduction management information generating section (604) that generates reproduction management information (S-VOG-GI) from the information on the I picture generated by the encoder section.



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CLAIMS

[Claim(s)]

[Claim 1] In what records the image information which contains a still picture in the information media in which an account rec/play student is possible in the data format of a predetermined format A mode assignment means to specify the still picture continuation taking-in mode in which a still picture is incorporated continuously, and an image information receiving means to receive image information including the still picture information beyond;1; if said still picture continuation taking-in mode is specified by said mode assignment means The content of an image of said image information received with said image information receiving means is checked. An image change detection means to detect that change if change arises by this content of an image; the still picture information on 1 equivalent to the content of an image as which said image change detection means detected change, or the 1 field An encoding means to encode to I picture of MPEG; digital image information equipment characterized by providing a data-format conversion means to change into the data format of said predetermined format the digital information containing I picture encoded with said encoding means.

[Claim 2] In what records the image information which contains a still picture in the information media in which an account rec/play student is possible in the data format of a predetermined format A mode assignment means to specify the still picture continuation taking-in mode in which a still picture is incorporated continuously, and an image information receiving means to receive image information including the still picture information beyond;1; if said still picture continuation taking-in mode is specified by said mode assignment means The content of an image of said image information received with said image information receiving means is checked.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to digital image information equipment equipped with the continuation incorporation function of a still picture.

[0002]

[Description of the Prior Art] The DVD video specification of having used the MPEG 2 (MUBINGU picture expert group 2) method for current, and the digital storage/playback of video (animation image), and having used AC-3 (digital audio compression 3) method etc. for the digital storage/playback of an audio (voice) is settled, and various playback devices (DVD video playr) using this specification are marketed.

[0003] This DVD video specification is supporting AC-3 audio and MPEG audio other than Linear PCM as MPEG 2 and a voice recording method as an animation compression method according to an MPEG 2 system layer. Moreover, this DVD video specification is also supporting ISO9660 and a UDF bridge format in titles at the ** corresponding to navigation data and a computer for [, such as subimage data and a rapid-traverse rewinding data search,] playback control.

[0004] Furthermore, development of the DVD disk (DVD-RAM in which read/write is possible, rewritable DVD-RW, or write-once DVD-R) which can be written in was also made, and the environment which can develop the record playback device (digital videodisc recorder which replaces the conventional analog video cassette recorder) of the digital image information using the DVD disk which can be written in is done.

[0005] From the above situation, in order to perform the digital storage and playback of a video image etc. on real time, the real-time recording specification for DVD (RTR-DVD specification) is proposed, and it is collected as specification of a forward type. This RTR-DVD specification is considered based on the DVD video specification already accepted in the market as formal specification, and the file system corresponding to this RTR-DVD specification is also current normalization advancing.

[0006]

[Problem(s) to be Solved by the Invention] By the way, by RTR-DVD specification, the a maximum of 63936-sheet (= maximum number of sheets 64 in maximum number 999x video object group of still cel) record of the still picture (still picture) can be carried out. An electronic "still" camera (digital camera) etc. can be considered as the source of this still picture. In this electronic "still" camera, semiconductor memory, such as an IC card, is used as a record medium of the photoed still picture.

[0007] On the other hand, disk media, such as an optical disk, are used for a RTR-DVD videocassette recorder. That is, the record medium used with an electronic "still" camera and a RTR-DVD videocassette recorder is different. For this reason, it is not easy to be crowded direct picking in a RTR-DVD videocassette recorder in the still picture data created with the electronic "still" camera.

[0008] Moreover, when incorporating two or more still pictures from a video signal (video signal containing two or more still picture group created on a motion-video signal, a usual electronic "still" camera, or a usual digital video movie), whenever the content of an image changes, a user has to choose

and set up the one-sheet incorporation still picture of one sheet, and there is a trouble of taking time and effort dramatically.

[0009] This invention aims at offering the digital image information equipment with a still picture continuation taking-in function which can incorporate two or more still pictures continuously from a video signal, even if it was made in view of the above-mentioned situation and a user does not choose and set up the one-sheet incorporation still picture of one sheet in detail.

[0010] Other objects of this invention are offering the two or more still picture record approach which incorporates two or more still pictures continuously, and records them from a video signal, even if a user does not choose and set up the one-sheet incorporation still picture of one sheet in detail.

[0011]

[Means for Solving the Problem] In order to attain the above-mentioned object, the digital image information equipment concerning this invention The key input section which specifies still picture continuation incorporation mode (607); After shifting to this still picture continuation incorporation mode, The information from this detection section The frame change detection section as which the incorporated frame detects that a front frame and the front content of an image differ from each other from the inputted video signal (604); to origin The incorporated frame data are compressed into I picture of MPEG. The encoder section which generates the pack structure specified by RTR-DVD specification (601); information about I picture generated in this encoder section is consisted of by the playback management information creation section (604) which creates playback management information (S_VOG_GI).

[0012] moreover, in order to attain the object besides the above, by the two or more still picture record approach concerning this invention the still picture group (VOG) of two or more still pictures within predetermined number of sheets (64 sheets) -- setting up --; (ST114 of drawing 14 ; ST214 of drawing 18) -- after image transcription initiation of said image information (ST116 yes; of drawing 14 ST216 yes of drawing 18) Record of said two or more still pictures contained in said image information is continuously performed to said data-logging area of said information media (100) (the image transcription processing loop formation containing ST118 of drawing 14 ; image transcription processing loop formation containing ST218 of drawing 18).; record said two or more still pictures carried out the management information (VOG information; S_VOG_GI of drawing 13) summarized in said every still picture group (VOG) -- creating --; (ST120 of drawing 14 ; ST220 of drawing 19) -- in the management information record area (VMG/S_AVFIT) of said information media (100) of said two or more still pictures in said created management information (S_VOG_GI) is written in (ST140 of drawing 14 ; ST140 of drawing 20) -- it is made like.

[0013] By carrying out like this, two or more still pictures can be automatically incorporated continuously from the video signal containing two or more still pictures by which continuation playback is carried out like a slide show, and the system recorded in a RTR-DVD format can be built.

[0014]

[Embodiment of the Invention] Hereafter, with reference to a drawing, the digital image information equipment with a still picture continuation taking-in function concerning the gestalt of 1 implementation of this invention is explained.

[0015] Drawing 1 is a block diagram explaining the whole digital image information equipment (RTR-DVD videocassette recorder) configuration with a still picture continuation taking-in function concerning the gestalt of 1 implementation of this invention.

[0016] The body of equipment of the RTR-DVD videocassette recorder shown in drawing 1 is said roughly, carries out revolution actuation of the rec/play possible optical disks 100, such as DVD-RAM, DVD-RW, or DVD-R, and consists of the disk drive section 609 which performs informational R/W to this disk 100, the encoder section 601 which constitutes an image transcription side, the decoder section 602 which constitutes a playback side, and a Main MPU section 604 which controls actuation of the whole equipment.

[0017] Furthermore, the recorder unit 700 which used the high-speed (a data transfer rate an IEEE1394 serial bus and more than equivalent; specifically 400Mbps(es) - 500Mbps class) hard disk drive (HDD)

with large capacity (for example, 30GB - 100GB or more than it) is connectable with the data bus which connects the disk drive section 609 and the Main MPU section 604.

[0018] Although this mass high-speed HDD recorder unit 700 is not necessarily required, if the disk drive section 609 and the HDD recorder units 700, such as DVD-RAM, are unified depending on the gestalt of implementation of this invention, the following will become possible, for example.

[0019] That is, an air check of the TV program etc. is carried out by the HDD recorder unit 700. If there are some programs (program contents to which the copy limit is not carried out) which think that a user does not want to erase among the programs which carried out an air check, after carrying out connector edit setting out of them suitably, it will copy to a DVD-RAM disk, a DVD-RW disk, or a DVD-R disk (backup). Then, the permanent preservation of a request program which carried out an air check by the HDD recorder unit 700 is attained, and a part to have copied to the disk on the other hand can make elimination possible from the HDD recorder unit 700 (the file of the copied program is thrown away into a garbage can icon). Then, a subsequent image transcription tooth space can be secured to the HDD recorder unit 700 now by the file size thrown away into the garbage can icon at an excess.

[0020] Or the air check of TV program can be performed by the mass (availability is 30GB) HDD recorder unit 700, and can also copy behind the long form which carried out an air check from the HDD recorder unit 700 to the DVD-RAM disk of two or more sheets for a long time which has not been settled, for example in one DVD-RAM disk of 4.7GB capacity. If it does in this way, the air-check leakage produced during the period which disk-swapping (or change of the disk for an image transcription) takes (several seconds - about dozens of seconds) can be prevented.

[0021] Or mixture record of a DVD-VR video signal, a DVD-AR audio signal, and the DVD-SR stream signal is carried out at arbitration at the HDD recorder unit 700. And it was also able to be said that only a DVD-VR video signal was copied to a certain DVD-RAM disk from the HDD recorder unit 700, only a DVD-AR audio signal was behind copied to other DVD-RAM disks, and only a DVD-SR stream signal was copied to the DVD-RAM disk of further others.

[0022] In addition, the HDD recorder unit 700 is not built in the equipment of drawing 1, but this equipment is considered as the configuration only for optical disk recorders, and you may make it prepare the IEEE1394 interface for HDD recorder unit 700 connection (or the tooth space and its connection slot for equipping with an HDD recorder unit behind) in this equipment.

[0023] The encoder section 601 of drawing 1 is equipped with the A/D-conversion section 614, the video encoding section 616, the audio encoding section 617, the sub(image SP) encoding section 618, the formatter section 619, and the buffer memory section 620.

[0024] The analog TV signal + analog sound signal from the external analog video signal + external analog audio signal or TV tuner section 613 from AV input section 612 etc. is inputted into the A/D-conversion section 614. This A/D-conversion section 614 digitizes the inputted analog video signal with the sampling frequency of 13.5MHz, and the quantifying bit number of 8 bits. Similarly, the A/D-conversion section 614 digitizes the inputted analog audio signal with the sampling frequency of 48kHz, and the quantifying bit number of 16 bits.

[0025] In addition, when an analog video signal and a digital audio signal are inputted into the A/D-conversion section 614, the A/D-conversion section 614 carries out the through pass of the digital audio signal. On the other hand, when a digital video signal and a digital audio signal are inputted into the A/D-conversion section 614, the A/D-conversion section 614 carries out the through pass of a digital video signal and the digital audio signal.

[0026] The digital video signal component from the A/D-conversion section 614 is sent to the formatter section 619 through the video encoding section 616. Moreover, the digital audio signal component from the A/D-conversion section 614 is sent to the formatter section 619 through the audio encoding section 617.

[0027] The video encoding section 616 has the function to change the inputted digital video signal into the digital signal compressed with the Variable Bit Rate based on MPEG 2 (or MPEG1) specification.

Moreover, the audio encoding section 617 has the function to change the inputted digital audio signal into

the digital signal (or digital signal of Linear PCM) compressed with the fixed bit rate based on MPEG or AC-3 specification.

[0028] When a DVD video signal is inputted from AV input section 612, or when a DVD video signal is broadcast and it is received in TV tuner section 613, the teletext signal component in a DVD video signal (or the closed caption CC) is inputted into SP encoding section 618. The subimage data inputted into SP encoding section 618 are arranged by predetermined signal aspect, and are sent to the formatter section 619.

[0029] Using the buffer memory section 620 as a work area, the formatter section 619 performs predetermined signal processing to the inputted video signal, an audio signal, a subvideo signal, etc., and outputs the record data corresponding to a predetermined format (file structure) to the data-processor section (D-PRO section) 610.

[0030] Here, the standard content of encoding processing for creating the above-mentioned record data is explained briefly. That is, if encoding processing is started in the encoder section 601 of drawing 1, a required parameter will be set up in encoding of a video data and others. Next, the PURIEN code of the main image data is carried out using the set-up parameter, and distribution of the optimal amount of signs for the set-up average transfer rate (record rate) are calculated. In this way, encoding of the main image is performed based on the amount distribution of signs obtained in PURIEN code. At this time, encoding of audio data is also performed simultaneously.

[0031] the result of a PURIEN code -- case (the DVD-RAM disk which it is going to record on videotape --) the amount of data compressions is inadequate When the video program of hope has not been settled in a DVD-RW disk, a DVD-R disk, or the HDD recorder unit 700, If it can have an opportunity to carry out a PURIEN code again, (if the source of an image transcription is the source in which repeated regeneration, such as a video tape or a videodisk, is possible) Partial re-encoding of the main image data is performed, and the main image data of the re-encoded part are permuted by part for the main image data division which carried out the PURIEN code before it. The main image data and audio data are encoded by such a series of processings, and the value of an average bit rate required for record is substantially reduced by them.

[0032] A parameter required to encode subimage data similarly is set up, and the encoded subimage data are created.

[0033] The main image data, audio data, and subimage data which were encoded as mentioned above are put together, and it is changed into the structure of RTR-DVD video.

[0034] The main image data, audio data, and subimage data which were encoded are subdivided by the pack of fixed size (2048 bytes) as shown in the lower berth of drawing 3. The dummy pack which is not illustrated is suitably inserted in these packs. In addition, in packs other than a dummy pack, time stumps, such as PTS (presentation time stump) and DTS (decoding time stump), are described suitably. About PTS of a subimage, the time amount which delayed arbitration from PTS of the main image data of the same playback time zone or audio data can be described.

[0035] And in order of the time code of each data, each data cell is arranged per video object unit (VOBU), and VOB which consists of two or more cels is constituted so that it may be refreshable. The VR_MOVIE.VRO file which summarized this VOB one or more, a VR_STILL.VRO file, a VR_AUDIO.VRO file, etc. are formatted by the directory structure of drawing 2.

[0036] In addition, since the content of a cel, a program chain, a managed table, the time stump, etc. had been decided since the start when the digital copy of the regenerative signal of DVD video was able to be carried out, it is not necessary to create these anew. However, in order to constitute a RTR-DVD videocassette recorder so that the digital copy of the DVD regenerative signal can be carried out, the suitable copyright safeguard needs to be provided.

[0037] The D-PRO section 610, the memory section 611, and system time counter (or system time clock) STC section 650 grade are connected to the disk drive section 609 which performs informational R/W (an image transcription and/or playback) to the DVD disk (DVD-RAM, DVD-RW, DVD-R, DVD-ROM) 100.

[0038] The D-PRO section 610 follows control of the Maine MPU section 604. Supply the RTR-DVD record data from the encoder section 601 to the disk drive section 609 and/or the HDD recorder unit 700, or Take out a RTR-DVD regenerative signal from a disk 100 or the HDD recorder unit 700, or The management information (some file data of drawing 2) recorded on the disk 100 is rewritten, or the data (a part of file or all) recorded on the disk 100 are deleted (processing which throws away a file into a garbage can icon).

[0039] The memory section 611 buffers a part for the constant rate of the data (data outputted from the encoder section 601) written in a disk 100 through the disk drive section 609, or is used for buffering a part for the constant rate of the data (data inputted into the decoder section 602) reproduced from the disk 100 through the disk drive section 609.

[0040] For example, when the memory section 611 consists of semiconductor memory (DRAM) which is 4 M bytes, the record for about 8 seconds or buffering of playback data is possible at the record rate of an average of 4 Mbps(es). Moreover, when the memory section 611 consists of EEPROMs (flash memory) which are 16 M bytes, buffering of the record for about 30 seconds or playback data is possible at the record rate of an average of 4 Mbps(es). Furthermore, it is also possible to use a part of record area of the HDD recorder unit 700 for buffering of playback data, for example.

[0041] The memory section 611 (or HDD recorder unit 700) can be used for storing temporarily image transcription information until it is exchanged for a disk with a new disk 100 when the disk 100 has been exhausted in the middle of an image transcription.

[0042] Moreover, the memory section 611 can be used also for storing temporarily the data by which reading appearance was more nearly usually than a drive carried out to the excess into fixed time amount when a high-speed drive (two X or more) is adopted as the disk drive section 609. Even when the reading data at the time of playback were buffered in the memory section 611, the optical pickup which is not illustrated with an oscillating shock etc. reads and an error is caused, a playback image can be prevented from breaking off by using it, changing the playback data buffered by the memory section 611.

[0043] Although not illustrated in drawing 1 , if the external card slot is prepared in the RTR-DVD videocassette recorder, Above EEPROM can carry out an option as an IC card of an option. Moreover, if the external drive slot or the USB interface is prepared in the RTR-DVD videocassette recorder, the option of the above HDD can be carried out as an extended drive of an option.

[0044] In addition, in the case (not shown) where a personal computer with a DVD-RAM drive is formed into a RTR-DVD videocassette recorder by software, a part of free area of the own hard disk drive of a personal computer or a part of main memory can be used as the memory section 611 of drawing 1 .

[0045] The Maine MPU section 604 of drawing 1 contains program ROM section 604c in which the control program (processing of drawing 14 - drawing 23) etc. was written other than the microcomputer (MPU or CPU) which is the core, character ROM section 604b of the kanji and others, work-piece RAM section 604a which offers a work area required for program execution (activation of processing of drawing 14 - drawing 23).

[0046] This Maine MPU section 604 contains the directory detection section 6041 which detects further the directory (hierarchical file structure as shown in drawing 2) of the data file recorded on the disk 100 (or HDD recorder unit 700) of drawing 1 , and the video object grouping section (VOG-ized section) 6043 mentioned later. These directory detection section 6041 and the VOG-ized section 6043 are physically written in program ROM section 604c as a firmware which the Maine MPU section 604 performs.

[0047] MPU of this Maine MPU section 604 performs processing of drawing 14 - drawing 23 mentioned later according to the control program stored in that ROM, using that RAM as a work area.

[0048] In these processings, the Maine MPU section 604 is provided with the data (an instruction of various processings, the chart lasting time of a still picture to carry out continuation incorporation, an initiation instruction of still picture continuation incorporation, text input about the content of an image transcription, etc.) which the user of a RTR-DVD videocassette recorder inputs from the key input section 607. As this key input section 607, although not illustrated, the keyboard of a personal computer, or a cursor key/ten key of remote control can be used.

[0049] The content of which the user of a RTR-DVD videocassette recorder should be notified among the activation results of the Maine MPU section 604 is displayed on the display 608 of a RTR-DVD videocassette recorder. And this content of advice is suitably displayed on a monitor display using an onscreen display (OSD), a subimage, etc.

[0050] In addition, the Maine MPU section 604 can determine the timing which controls the disk drive section 609, the D-PRO section 610, the encoder section 601, and/or the decoder section 602 based on the time data from the STC section 650 (although actuation of an image transcription and playback is usually performed synchronizing with the timer clock from the STC section 650, the other processing may be performed to the timing which became independent in the STC section 650).

[0051] Moreover, the Maine MPU section 604 can also perform now processing of the image transcription time of each program recorded on the disk 100, the registration time of an entry point, etc. based on the time data from the timer clock generating section which is not illustrated.

[0052] The separation section 625 which the decoder section 602 of drawing 1 separates each pack from RTR-DVD playback data with pack structure as shown in drawing 3, and is taken out, The memory 626 used at the time of signal-processing activation of pack separation and others, and the video decoding section 628 which decodes the main image data (the content of the video pack) separated in the separation section 625, The sub(image SP) decoding section 627 which decodes the subimage data (the content of the subimagery pack) separated in the separation section 625, The audio decoding section 630 which decodes the audio data (the content of the audio pack) separated in the separation section 625, The subimage data from SP decoding section 627 are suitably compounded from the video decoding section 628 to a video data. The video processor (V-PRO) section 638 which outputs the subimage of a menu, a highlights carbon button, and a title and others to the main image in piles, It has the D/A converter (for audios) 632 which changes the digital audio output from the audio decoding section 630 into an analog audio signal.

[0053] Here, the video decoding section 628 contains cutback image (thumbnail picture) generation section 628a. This generation section 628a reduces the read image data, transmits it to the frame memory section 606, and it is constituted so that a cutback image (thumbnail picture) can be outputted to the external monitor TV 637.

[0054] The OSD data (text etc.) suitably supplied from the main image data (cutback image data is included suitably) and the Maine MPU section 604 which are outputted from the V-PRO section 638 are inputted into the video mixing section 605. This OSD data is superimposed on the frame memory section 606 by the main image data from the V-PRO section 638. The main image data with which it was superimposed on this OSD data are outputted from the video mixing section 605.

[0055] The digital video output from the video mixing section 605 is changed into an analog video signal by the D/A converter 636, and is supplied to the external monitor TV 637 while an external output is carried out through digital output I/F634. Then, various text information etc. is displayed on TV637 with the main image.

[0056] The digital audio output from the audio decoding section 630 is changed into an analog audio signal by the D/A converter 632, and is supplied to an external speaker 633 while an external output is carried out through digital output I/F631.

[0057] It is as follows when the example of the equipment of drawing 1 of operation is summarized simply. That is, the analog AV signal inputted from the A/V input section 612 is digital-signal-ized in the A/D-conversion section 614. A video signal is inputted into the video encoding section 616 among the digital signal, an audio signal is inputted into the audio encoding section 617, and alphabetic data, such as a teletext, is inputted into SP encoding section 618. MPEG compression of the video signal inputted into the video encoding section 616 is carried out, the audio signal inputted into the audio encoding section 617 is AC-3-compressed or MPEG audio compressed, and run length compression of the alphabetic data (bit map data) inputted into SP encoding section 618 is carried out.

[0058] Furthermore, from each encoder sections 616-618, when various compressed data is pack-ized, it is packet-ized so that it may become 2048 bytes, and is inputted into the formatter section 619. In the formatter section 619, it is pack-ized, and further, each packet is multiplexed and is sent to the D-PRO

section 610.

[0059] When 1GOP at this time, for example, MPEG, is set as the encoder section 601 as VOB which is the data unit of DVD video, the carving information at that time is saved in the buffer memory section 620. If this carving information accumulates to some extent in the buffer memory section 620, it will be transmitted to the Main MPU section 604. The Main MPU section 604 creates time map information based on the transmitted information. (This time map information is sent out at the times, such as GOP head interruption.) I picture which is here and corresponds to that VOB as the above-mentioned carving information from the magnitude of VOB, the playback time amount from a VOB head to that VOB last, and a VOB head -- and -- up to the address -- etc. -- it thinks.

[0060] Moreover, based on the above-mentioned carving information, the formatter section 619 creates time map information, and passing it to the Main MPU section 604 in the form of a time map is also considered directly.

[0061] The D-PRO section 610 divides each encoded data pack train every 16 packs, forms an ECC block, attaches error correction data to the ECC block, and records it on the optical disks 100, such as DVD-RAM, by the disk drive section 609.

[0062] Here, when the disk drive section 609 will be in busy status for a track jump etc. during seeking, the digital signal stream of the ECC block with error correction data is stored temporarily in the memory section 611, and it will wait for it until it is [record] ready for the disk drive section 609.

[0063] Here, in the real-time DVD recorder of drawing 1 using DVD-RAM etc., processing of a still picture can be performed as follows, for example.

[0064] For example, if the video signal of a still picture is inputted into the A/V input section 612 after shifting to a still picture recording mode with the user directions from the key input section 607, the MPEG video encoding section 616 will compress the incorporated still picture data as I picture data, will add a sequence end code after the compressed data further, and will change it into pack structure. This I picture data of one sheet is recorded as 1VOB=1VOB, as shown in drawing 3.

[0065] Furthermore, when two or more still pictures are incorporated, a group is formed with the still picture of less than 64 sheets, and it is referred to as VOG (video object group). This VOG is a break on management and is equivalent to VOB in animation playback.

[0066] To this incorporated still picture, management information (S_AVFI/S_VOGI) is built for every VOG, and the management information (program chain information) which determines the order of playback of incorporated two or more still pictures is registered into ORG_PGCI.

[0067] Although later mentioned with reference to drawing 16 as conditions for forming VOG at this time When record number of sheets reaches fixed numbers (usually 64 sheets) and the recording mode of a still picture is changed, When a user presses the grouping key (key contained in the key input section 607 of drawing 1) which is not illustrated (under still picture continuation record) and a record date is set up, the case where the date changes etc. can be considered.

[0068] Actually, it is the combination of the above-mentioned conditions and VOG can carve.

[0069] Modification of the resolution of a still picture, the change of the monochrome / stereo / dual monochrome of the audio reproduced in connection with the still picture, modification of the compression method of the audio reproduced in connection with the still picture, modification of the pallet data of the subimage reproduced in connection with the still picture, etc. can be considered to be the cases where the recording mode of a still picture is changed among the above-mentioned conditions.

[0070] The information about these recording-mode modification is recorded on management information S_VOB_STI later mentioned with reference to drawing 13, and can process now the information about recording-mode modification by recording the stream information number (S_VOB_STIN) of an applicable recording mode on S_VOG_GI of drawing 12 mentioned later.

[0071] Drawing 2 is drawing explaining the directory structure of the digital information file recorded on the information medias (DVD-RAM, DVD-RW, DVD-R, HDD, etc.) of drawing 1.

[0072] Two or more specification exists in DVD, and the directory exists for every specification. That is, by DVD video, the directory of DVD_RTAV210 is prepared in the directory of AUDIO_TS220, and

RTR-DVD (rec/play DVD) in the directory (not shown) of VIDEO_TS, and a DVD audio. And the record data of each specification exist in the file of a corresponding directory.

[0073] By DVD video, data are saved by the usual file format. Each title recorded on DVD video is equivalent to one duty of a film, and this or more 1 close title is in the disk of one sheet. That for which this title gathered is called title set, and this title set consists of multiple files.

[0074] The title set (VTS) consists of a management information file which the information for managing this title set calls video title set information (VTSI), a video file which consists of video datas, and a backup file of VTSI. Furthermore, by DVD video, the management information file called a video manager (VMG) as information for managing this disk exists in the disk of one sheet.

[0075] On the other hand, in RTR-DVD (rec/play DVD), as shown in drawing 2 , the VR_MOVIE.VRO file 231 and the data file VR_STILL.VRO file 232 for still pictures which are one data file for animations exist in one disk, and the management information (video manager VMG) VR_MANGR.IFO file 230 for managing these video-data files is recorded.

[0076] moreover -- the specification of Rec/play DVD -- VMGI and VTSI of said DVD video -- together -- carrying out -- the overall management information VMG -- constituting -- this VMG -- a video-data file -- managing -- **** .

[0077] In addition, by the RTR-DVD recorder of drawing 1 concerning the gestalt of 1 implementation of this invention, the video file for animations (VR_MOVIE.VRO231 of drawing 2) and the data file for still pictures (VR_STILL.VRO232 of drawing 2) are taken as one file each at one disk.

[0078] Said video-data file is managed by the layered structure, as shown in drawing 2 , one video object set (VOBS) consists of one or more VOB(s), and one VOB consists of one or more video object units (VOBU). Moreover, each VOB is constituted by two or more packs which consist of data of various classes. One pack consists of a pack header and one or more packets, and each video data and audio data are recorded in this packet.

[0079] Drawing 3 is drawing explaining the DS of the video object set (VOBS) included in the digital information (an animation, a still picture, voice, subimage, etc.) recorded on the information medias (DVD-RAM, DVD-RW, DVD-R, HDD, etc.) of drawing 1 . Information contents, such as a video data, still picture data, voice data, and subimage data, are recorded on this VOBS.

[0080] Here, about still picture data, it is managed as one I picture =1 ** VOB [VOB=1 **], and continues after the video-data pack (V pack) train with the subimagery pack (SP pack) train and the audio pack (A pack) train so that it may be illustrated by drawing 3 . However, in the case of still picture data, subimage data and/or audio data are options, and there may be. [no]

[0081] Here, a pack is a smallest unit which performs data transfer processing. Furthermore, the smallest unit which performs processing on logic is a cel unit, and processing on logic is performed per cel. And the playback sequence of a cell data is defined by the program chain (PGC). Two or more programs (PG) are registered into this PGC, and one or more cels are registered into this PG. The program chain information (PGCI) included in said VMG has recorded this structure of PGC actually. Regeneration is performed according to this PGCI and PGCI is created at the time of record or edit.

[0082] Drawing 4 is drawing explaining the DS of the management information (VMG/PGCI/CI) used by the information medias (DVD-RAM, DVD-RW, DVD-R, HDD, etc.) of drawing 1 . In RTR-DVD (rec/play DVD), the management information VMG of structure as shown in drawing 4 is used.

[0083] In drawing 4 (a), the fundamental information on the record refreshable optical disk (RTR disk) 100 of drawing 1 is described by RTR video manager information RTR_VMGI. This RTR_VMGI contains video manager information management table VMGI_MAT and play list search pointer table PL_SRTP.

[0084] RTR_VMGI contains movie AV file information table M_AVFIT, still drawing AV file information table S_AVFIT, original copy PGC information ORG_PGCI, custom PGC information table UD_PGCI, text data manager TXTDT_MG, and the manufacturer information table MNFIT further.

[0085] Drawing 4 (b) shows the DS of UD_PGCI of drawing 4 (a). UD_PGCI contains custom PCG information table information UD_PGCI, one or more custom PGC search pointer UD_PGCI_SRP#1 -

UD_PGCI_SRP#n, and one or more custom PGC information UD_PGCI#1 - UD_PGCI#n.

[0086] The program chain numbers PGCN from 1 to 99 are assigned to all UD_PGC in written sequence of UD_PGCI_SRP in UD_PGCIT. Each PGC can be specified by this PGCN. Here, UD_PGCIT contains UD_PGCI_SRP_Ns which shows the number of UD_PGCI_SRP, and UD_PGCIT_EA which shows the ending address of UD_PGCIT.

[0087] In addition, the maximum of UD_PGCI_SRP_Ns is set as "99." The ending address of UD_PGCIT is expressed that UD_PGCIT_EA is also at the relative cutting tool number from the cutting tool of the beginning of UD_PGCIT.

[0088] Moreover, UD_PGCI_SRP contains starting address UD_PGCI_SA of UD_PGCI. The starting address of UD_PGCI is expressed that this UD_PGCI_SA is also at the relative cutting tool number from the cutting tool of the beginning of UD_PGCIT.

[0089] In Rec/play DVD, PGC special [for carrying out cel playback] to the order of record is called an original copy PGC, and the information on this original copy PGC is recorded on ORG_PGCI. Moreover, PGC for carrying out cel playback in the sequence which the user set to arbitration after record is called custom PGC, and information UD_PGCI of one or more custom PGC is recorded on UD_PGCIT. VOB of itself does not have custom PGC, but it is constituted so that VOB in an original copy PGC may be referred to.

[0090] Drawing 4 (c) shows the DS of ORG_PGCI of drawing 4 (a), and each UD_PGCI of drawing 4 (b). Each PGC includes the navigation information for the program chain PGC.

[0091] As shown in drawing 4 (c), PGC information (PGCI) contains PGC general information PGC_GI, cel information search pointer table CI_SRPT which consists of a program information table PGIT which consists of one or more program information PGI, and one or more cel information search pointer CI_SRP, and the cel information table CIT which consists of one or more cel information CI.

[0092] Drawing 4 (d) shows the DS of the cel information table CIT of drawing 4 (c). This CIT consists of cel information CI#1 - CI#j. Here, CI_SA described that the starting address of each cel information CI is also at the relative cutting tool number from the cutting tool of the beginning of PGCI can show.

[0093] Drawing 4 (e) shows the DS of each cel information CI on drawing 4 (d). Each CI contains cel general information C_GI and one or more cel entry point information C_EPI#1 - C_EPI#k so that it may illustrate.

[0094] Drawing 5 is drawing explaining the content of cel general information C_GI (still picture cel general information S_C_GI) contained in the management information (CI) of drawing 4 .

[0095] This C_GI contains the cel type (C_TY) which described the format of an applicable cel, a VOB group's still picture VOB group information search pointer number (S_VOI_SRPN) used by this cel, the number (C_EPI_Ns) of the cel entry point information in this cel, the starting address (S_S_VOB_ENTN) of the still picture VOB entry number of this cel, and the ending address (E_S_VOB_ENTN) of the still picture VOB entry number of this cel.

[0096] Drawing 6 is drawing explaining the content of cel entry point information C_EPI (still picture cel entry point information S_C_EPI) contained in the management information (CI) of drawing 4 .

[0097] This C_EPI includes the entry point type (EP_TY) which described the format of an entry point, the entry number (S_VOB_ENTN) of a still picture VOB, and primary text information (PRM_TXTI). The flag which shows the existence of PRM_TXTI is described by EP-TY. The number of initiation S_VOB is described by S_VOB_ENTN. In PRM_TXTI, the information on the comment related to a corresponding still picture and others can be described.

[0098] A record format of the carving information used with the equipment of drawing 1 is shown in drawing 7 - drawing 11 .

[0099] Drawing 7 is drawing explaining the DS of the management information (VMG/S_AVFIT/S_AVFI/S_VOI) of the still picture used by the information medias (DVD-RAM, DVD-RW, DVD-R, HDD, etc.) of drawing 1 .

[0100] VMG of drawing 7 (a) has the same DS as VMG of drawing 4 (a). The still picture AV file information table (S_AVFIT) contained in VMG of drawing 7 (a) contains still picture AV file

information table information (S_AVFITI), the stream information on a still picture VOB (S_VOB_STI#1-#n), still picture AV file information (S_AVFI), the stream information on the addition audio to a still picture (S_AA_STI#1-#m), and the file information (S_AAFI) of the addition audio to a still picture, as shown in drawing 7 (b).

[0101] In addition, each S_AA_STI of drawing 7 (b) includes the audio attribute information on an addition audio stream.

[0102] S_AVFI of drawing 7 (b) contains general information S_AVFI_GI of S_AVFI, search pointer S_VOI_SRP#1 - #n of still picture VOB group information, and still picture VOB group information S_VOI#1 - #n, as shown in drawing 7 (c).

[0103] S_VOI of drawing 7 (c) consists of a still picture VOB group's general information S_VOG_GI, and VOB entry S_VOB_ENT#1-#n for one or more still pictures, as shown in drawing 7 (d). There are four kinds (Type A - Type D) of each S_VOB_ENT.

[0104] Drawing 8 is drawing explaining the content of still picture video object entry S_VOB_ENT (Type A) contained in the still picture management information (S_VOI) of drawing 7 (d). S_VOB_ENT of Type A includes the information (S_VOB_ENT_TY) which shows the format of the VOB entry of a still picture, and the information (V_PART_SZ) which expressed the size of the video PART in a still picture VOB per sector.

[0105] Drawing 9 is drawing explaining the content of still picture video object entry S_VOB_ENT (Type B) contained in the still picture management information (S_VOI) of drawing 7 (d). S_VOB_ENT of Type B includes the information (A_PART_SZ) which expressed the size of the original Audie OPART in a still picture VOB (original copy) other than S_VOB_ENT_TY of Type A, and V_PART_SZ per sector, and the information (A_PB_TM) which expressed the playback time amount of this Audie OPART per video field.

[0106] In addition, when the playback time amount of actual Audie OPART is not in agreement with the boundary of the video field, a part to overflow the video field among the tail data of Audie OPART is omitted.

[0107] Drawing 10 is drawing explaining the content of still picture video object entry S_VOB_ENT (Type C) contained in the still picture management information (S_VOI) of drawing 7 (d). S_VOB_ENT of Type C includes an addition audio group's number information (S_AAGN) included in the audio stream added to the still picture VOB other than S_VOB_ENT_TY of Type A, and V_PART_SZ, and the information (AA_ENTN) on the entry number corresponding to the addition audio stream for these still pictures VOB.

[0108] Drawing 11 is drawing explaining the content of still picture video object entry S_VOB_ENT (Type D) contained in the still picture management information (S_VOI) of drawing 7 (d). S_VOB_ENT of Type D contains S_AAGN and AA_ENTN of Type C other than S_VOB_ENT_TY of Type B, V_PART_SZ, A_PART_SZ, and A_PB_TM.

[0109] Type A - Type D of above-mentioned S_VOB_ENT all contain S_VOB_ENT_TY and V_PART_SZ of Type A in common.

[0110] Drawing 12 is drawing explaining the content of still picture video object group general information S_VOG_GI contained in the still picture management information (S_VOI) of drawing 7 (d).

[0111] This S_VOG_GI includes the number (S_VOB_Ns) of the still pictures VOB registered into Relevance VOG, the still picture VOB stream information number (S_VOB_STIN), the hour entry (FIRST_VOB_REC_TM) when VOB of the beginning in this VOB group is recorded, the hour entry (LAST_VOB_REC_TM) when VOB of the last in this VOB group is recorded, and the starting address (S_VOG_SA) of this VOB group in a still picture AF file. This S_VOG_SA expresses the relative address from the head of S_AVFI per sector.

[0112] Drawing 13 is drawing explaining the content of still picture video object stream information S_VOB_STI contained in the still picture management information (S_AVFIT) of drawing 7 (b). A format of the stream information STI updated in the equipment of drawing 1 is shown in drawing 13.

[0113] That is, this S_VOB_STI contains video attribute information V_ATR which described the video encoding method of an applicable still picture, audio attribute information OA_ATR which described the audio encoding method (or attribute of an original copy audio stream) of an option, subimage attribute information SP_ATR which described the encoding method of a subimage, and SP_PLT which described the color palette data of a subimage.

[0114] Drawing 14 is flow chart drawing explaining the overall image transcription procedure by the equipment of drawing 1. Hereafter, the processing at the time of the usual still picture image transcription is explained according to the flow of drawing 14.

[0115] First, the data of a file system are read from a disk 100 (step ST 100), and the availability of the disk is checked (step ST 102). When there is no availability, the alarm display "there is no image transcription tooth space" is outputted to a display (no [step ST102]) 608 and/or TV637, and image transcription processing is ended.

[0116] (Step ST102 Yes), when an availability is in a disk 100, image transcription pretreatment is performed (step ST 110). In this pretreatment, the writing (incorporation and creation of a VMG file) and others of a management domain are performed.

[0117] Next, it is confirmed whether the still mode in which a still picture is incorporated by the user from the key input section 607 etc. is set up (step ST 112). If still mode is not set up (no [step ST112]), a return is carried out to processing of the motion-video image transcription by movie mode etc.

[0118] If still mode is set up (step ST112 yes), a user will be made to set up the existence of voice record and will be made to set up chart lasting time further (step ST 114). When you have no voice record, a user is made to set up still time amount (step ST 114). Furthermore the STC section 650 is reset and initial setting of each encoding sections 616-618 is performed (step ST 114).

[0119] Here, when VMG is recorded on the disk 100, STI suitable for the attribute of hope is chosen from the stream information STI, and the value of selected STI is set to each encoding sections 616-618 (step ST 114).

[0120] When VMG is not recorded on a disk 100, the equipment (MPU section 604) of drawing 1 generates VMG, and you may register with a STI table. Not only the case of still picture record playback but in animation processing, this processing is performed. However, in the flow of drawing 14, this VMG registration (writing) processing is performed at the time of image transcription termination.

[0121] Next, it is confirmed whether the image transcription key / the REC key (it is equivalent to the shutter release of a function top camera) prepared in the key input section 607 or the remote controller which is not illustrated of drawing 1 were inputted (step ST 116).

[0122] When there is an input of an image transcription key / the REC key (step ST116 yes), image transcription initiation setting out is made (step ST 118). In this setting out, the image transcription instruction for one picture (one still picture) is set as the video encoding section 616, and, in with voice record, that sound recording time amount and a sound recording initiation instruction are set as the audio encoding section 617 (step ST 118).

[0123] In this way, the still picture with which the still picture video signal for one picture was incorporated by the encoder section 601, and was incorporated is compressed and pack-ized, and is recorded on a disk 100. When voice record is specified at this time, voice incorporated by the encoder section 601 is also compressed and pack-ized, and it is recorded on a disk 100. In this way, the record address of the still picture and voice which were pack-ized is determined with reference to a file system (step ST 120).

[0124] In this step ST 120, it writes in besides the write-in address, and size is also determined and the MPU section 604 publishes a write-in instruction in the disk drive section 609 based on the address and size which were determined. With this instruction issuance, the MPU section 604 creates VOG information (S_VOGI of drawing 7 (d)) (step ST 120). Grouping of the still picture of the specified number of sheets (S_VOB_Ns of drawing 12) etc. is performed by this created VOG information.

[0125] In addition, when there is no input of said the image transcription key / REC key (no [step ST116]), processing of a step ST 118 and a step ST 120 is skipped.

[0126] Next, it is confirmed whether the image transcription processing end key / the STOP key prepared in the key input section 607 or the remote controller which is not illustrated of drawing 1 were pressed (step ST 122).

[0127] If there is no input of an image transcription processing end key / the STOP key (no [step ST122]), the check of whether there is any remaining capacity which can be recorded on videotape on a disk 100 will be performed (step ST 132).

[0128] If it remains in a disk 100 and there is capacity (no [step ST132]), it will return to a step ST 116 and processing of steps ST118-ST120 will be repeated.

[0129] If it remains in a disk 100 and there is no capacity (step ST132 yes), the alarm display "there is no image transcription tooth space" will be outputted to a display 608 and/or TV637 (step ST 134), and it will shift to an image transcription post process (step ST 140).

[0130] In addition, when there is an input of said the image transcription processing end key / STOP key (step ST122 yes), processing of a step ST 132 and a step ST 134 is skipped, and shifts to an image transcription post process (step ST 140).

[0131] In the image transcription post process of a step ST 140, a VMG file is terminated, and a VMG file and a video file are registered into a file system, and are updated.

[0132] In this image transcription post process, S_AVFIT (VOG information S_VOGL is included) and PGCI are completed from carving information etc., and, specifically, it investigates whether the stream information STI used for the image transcription is in the video manager information VMGI. When this STI is not in VMGI, STI used for the image transcription is registered into VMGI. When this STI is in VMGI, the STI number used for the image transcription is registered into S_VOGL. And the formatter section 619 of drawing 1 is initialized and the writing of PGCI, carving information, etc. is performed after an appropriate time to VMG (step ST 140).

[0133] Drawing 15 is flow chart drawing explaining the content of image transcription pretreatment (step ST 110) in the procedure of drawing 14 . Hereafter, pretreatment at the time of image transcription initiation is explained according to the flow of drawing 15 .

[0134] First, a file system is checked from the volume structure of a disk 100 (step ST 1100). (Step ST1100 No), when the volume structure is not recorded on a disk 100, a file system is built (step ST 1102) and a DVD-RTR directory as shown in drawing 2 is created (step ST 1104).

[0135] (Step ST1100 Yes), a DVD-RTR directory is checked when the volume structure is recorded on the disk 100 (step ST 1106). (Step ST1106 No), when there is no DVD-RTR directory, a DVD-RTR directory is created (step ST 1108).

[0136] When there is a DVD-RTR directory (step ST1106 yes), or when a DVD-RTR directory is created (steps ST1104 or ST1108), the check of whether the error occurred in the file system read from the disk 100 is performed (step ST 1110).

[0137] (Step ST1110 Yes), when an error occurs, it expresses "the error occurred with the file system" etc. as the display 608 and/or TV637 of drawing 1 (step ST 1112), and processing is ended, or a return is carried out to error restoration (or restart of system) processing etc.

[0138] If an error does not occur (no [step ST1110]), it is confirmed whether management information VMG is in a disk 100 (step ST 1114).

[0139] VMG will be created if there is no VMG (no [step ST1114]) (step ST 1116). Although VMG created at this time may be recorded on the management file (VR_MANGR.IFO) of a disk 100, it does not only have to presuppose that it is to develop to work-piece RAM604a of the Main MPU section 604 of drawing 1 , and it is not necessary to record it on a disk 100. In that case, what is necessary is just to save VMG of the content updated in the form where the content of an image transcription was made to reflect at the time of image transcription termination at the management file (VR_MANGR.IFO) of a disk 100.

[0140] If VMG is in a disk 100 (step ST1114 yes), the VMG will be read into work-piece RAM604a of the Main MPU section 604 from a disk 100 (step ST 1118).

[0141] If an error does not occur here (no [step ST1120]), a return is carried out to the step ST 112 of drawing 14 . If an error occurs (step ST1120 yes), it will express "creation of management data was not

completed" etc. as a display 608 and/or TV637 (step ST 1122), and processing will be ended, or a return will be carried out to error restoration (or restart of system) processing etc.

[0142] The timing which performs image transcription pretreatment of drawing 15 can consider three kinds of timing as follows.

[0143] When the disk drive section 609 of drawing 1 is loaded with a disk 100 the first, it is the approach of performing promptly. Although there is an advantage that an image transcription can be started immediately, by this approach after pressing an image transcription key / the REC key, when it loads with a disk 100, the setup time will cut in some [many].

[0144] The second is the approach of performing, when the format carbon button which the key input section 607 does not illustrate is pushed. This approach has before record the fault that a format key must be pressed.

[0145] The third is the approach of carrying out at the time of image transcription initiation. Since some time lag arises to image transcription initiation in case of this approach after pressing an image transcription key / the REC key, it is necessary to save record data in the meantime in the memory section 611.

[0146] Drawing 16 is flow chart drawing explaining the content of the VOG information creation processing (step ST 120) in the procedure of drawing 14 .

[0147] First, there are the number of packs of the recorded still picture VOB, the number of packs of an audio, the playback time amount of an audio, and a subimage SP, those without /etc. are carved, and it incorporates as information, and registers with VOB_ENT of drawing 8 - drawing 11 (step ST 1200).

[0148] Next, the conditions of VOG-izing of two or more still pictures are checked (step ST 1202).

The :conditions 1 which have the following (independent or two or more combination) as this VOG-ized condition: It is whether the record number of sheets of a still picture reached fixed numbers (for example, 64 sheets).;

condition 2: -- when the date (time amount) of record was set up, or the date (time amount) changed (or was regular time amount reached?) -- how -- it is --;

Conditions 3: ***** [having pressed the change key (grouping key) of VOG which a user does not illustrate manually];

Conditions 4: The still picture recording mode was changed, or (did the source attribute of a still picture change?) they are how,;, etc.

[0149] If it corresponds to any one or more [of the above-mentioned conditions 1-4] (condition relevance of a step ST 1202), various information (the number of the still pictures VOB registered into applicable S_VOG, the number of the stream information STI which is in agreement with the attribute information on VOG, recording start time amount of the first VOB, recording start time amount of the last VOB, etc.) will be registered into S_VOG_GI of closing and drawing 12 for the VOG (step ST 1204).

[0150] If it corresponds to neither of the above-mentioned conditions 1-4 (un-corresponding [of a step ST 1202]), processing of a step ST 1204 is skipped.

[0151] Drawing 17 is flow chart drawing explaining the content of the image transcription after treatment (step ST 140) in the procedure of drawing 14 . This processing is performed in common with an animation/still picture.

[0152] First, the Main MPU section 604 updates VMG in work-piece RAM604a based on the carving information received from the formatter section 619 (step ST 1400).

[0153] Next, it is confirmed whether the attribute data used for the image transcription is shown in the table of the stream information STI in VMG (step ST 1402). (Step ST1402 Yes), when attribute data exists in a STI table, the STI number is registered into M_VOBI (in the case of an animation), or S_VOBI (in the case of a still picture) (step ST 1404).

[0154] (Step ST1402 No), when attribute data does not exist in a STI table, it checks to see the number of STI currently recorded has reached maximum (that is, is an opening shown in a STI table or not?) (step ST 1406). (Step ST1406 No), when the number of STI has not reached maximum (that is, an opening is shown in a STI table), the STI information used for the image transcription is registered into a STI table,

and the number of the STI registered newly is further registered into M_VOBI (in the case of an animation), or S_VOBI (in the case of a still picture) (step ST 1408).

[0155] (Step ST1406 Yes), when the number of STI has reached maximum (that is, there is no opening in a STI table), M_VOBI (in the case of an animation) or S_VOBI (in the case of a still picture) registered is investigated, and it is confirmed whether there is STI which is not used (step ST 1410). (Step ST1410 Yes), when there is intact STI, registration of intact STI information is erased, new STI is secured, the STI information used for the image transcription is registered into the place of the secured STI (step ST 1412), and it shifts to a step ST 1408. At a step ST 1408, the number of STI registered at a step ST 1412 is registered.

[0156] (Step ST1410 No), when there is no intact STI, the display 608 and/or TV637 of drawing 1 perform an error message, and error termination of the processing of drawing 17 (step ST 1414) is carried out.

[0157] If a STI number is registered into M_VOBI (in the case of an animation), or S_VOBI (in the case of a still picture) (steps ST1404 or ST1408), it will be confirmed whether a VRO file (VOBS file) exists in the directory record information under the DVD_RTAV directory in a file system (drawing 2) (step ST 1416).

[0158] (Step ST1416 Yes), when a VRO file (VOBS file) exists, it is updating information on the VRO file (VOBS file) (to recorded information on a video file), and a directory record is updated (step ST 1418). (Step ST1416 No), when a VRO file (VOBS file) does not exist, additional (to recorded information on a video file) registration of the directory record information on a VRO file (VOBS file) is carried out (step ST 1420).

[0159] If updating (step ST 1418) or registration (step ST 1420) of directory record information ends, it will be confirmed whether a VR_MANGR.IFO file (VMG file) is in the directory record information under a DVD_RTAV directory (drawing 2) (step ST 1422).

[0160] When there is a VR_MANGR.IFO file (VMG file) (step ST1422 yes), the VMG information in work-piece RAM604a is written in the location of this IFO file, and the directory record information under a DVD_RTAV directory is updated (step ST 1424).

[0161] When there is no VR_MANGR.IFO file (VMG file) (no [step ST1422]), the information on VMG built in work-piece RAM604a is recorded on the free area of a disk 100, and additional registration of the information on an IFO file is carried out at the directory record information under a DVD_RTAV directory (step ST 1426).

[0162] In addition, processing about the stream information STI on drawing 17 can also be performed before an image transcription.

[0163] Drawing 18 - drawing 20 are flow chart drawings explaining the procedure of the still picture continuation incorporation image transcription by the equipment of drawing 1 .

[0164] First, the data of a file system are read from a disk 100 (step ST 200), and the availability of the disk is checked (step ST 202). When there is no availability, the alarm display "there is no image transcription tooth space" is outputted to a display (no [step ST202]) 608 and/or TV637, and image transcription processing is ended.

[0165] (Step ST202 Yes), when an availability is in a disk 100, image transcription pretreatment is performed (step ST 110). In this pretreatment, a VMG file is incorporated and each of those set points (PGCI, S_VOBI, etc.) are saved at work-piece RAM section 604a of the Main MPU section 604.

[0166] Next, it is confirmed whether the slide show incorporation mode in which two or more still pictures are continuously incorporated by the user from the key input section 607 etc. is set up (step ST 212). If slide show incorporation mode is not set up (no [step ST212]), a return is carried out to other processings.

[0167] If slide show incorporation mode is set up (step ST212 yes), a user will be made to set up the existence of voice record and voice chart lasting time will be made to set up further (step ST 214). (also including no time amount restricting) When not carrying out voice record, a user is made to set up still time amount (step ST 214). Set-up the maximum sound recording time amount (or time amount

unrestricted condition) or still time amount is saved at work-piece RAM section 604a. Furthermore the STC section 650 is reset and initial setting of each encoding sections 616-618 is performed (step ST 214). [0168] In this initial setting, a still picture recording mode (I picture still recording mode), VOG carving mode, voice chart lasting time, etc. are set up. Moreover, the stream information STI data in work-piece RAM section 604a are investigated, and if there are some which are in agreement with the attribute information on the data which should be recorded on videotape, the STI number is saved at work-piece RAM section 604a. When there is nothing that is in agreement with the attribute information on the data which should be recorded on videotape, the attribute information on this data that should be recorded on videotape is saved as STI at work-piece RAM section 604a.

[0169] Moreover, in initial setting of a step ST 214, a user is made to set up the image transcription time at the time of slide show photography, and while saving it at work-piece RAM section 604a, it is set as the formatter section 619 (step ST 214). In addition, when user setting out of image transcription time is not made, the incorporated time is set up.

[0170] Furthermore, a user is made to specify the incorporation initiation frame number after image change in initial setting of a step ST 214 (step ST 214). Although this incorporation initiation frame number specifies the image of what frame is incorporated after an image changes, when not specifying, it will incorporate the image frame of **** after change. (However, when the approach of detecting and incorporating the fixed frame number having continued after change is adopted) it is not necessary to make a user specify this frame number. Making a user specify the frame number which points out the frame of what position is incorporated after image change here. It is because when the electronic "still" camera etc. is performing slide show playback, and effect processing of fade-in, fade-out, etc. is being performed (in order to make it not incorporate the frame under fade-in or fade-out).

[0171] Detecting that a fixed number of same image frames continued after frame change detection instead of such frame number assignment, and incorporating frame data by making the detected signal into a trigger is also considered.

[0172] Then, the input check of the slide show incorporation initiation key (not shown) prepared in the key input section 607 or the remote controller which is not illustrated of drawing 1 is made (step ST 216).

[0173] When there is an initiation key input (step ST216 yes), image transcription initiation setting out is made to the encoder section 601 (step ST 218). In this setting out, when audio encoding is set up with setting out which encodes one frame (or 1 field) as an I picture, setting out which specifies no initiation [of audio encoding] and maximum sound recording time amount, or time amount restricting as the audio encoding section 617 is made.

[0174] After image transcription initiation setting out is made at a step ST 218, the input check (step ST 222) of an image transcription end key, a sound recording passage-of-time check (step ST 224), and the change check (step ST 226) of the content of an image are made.

[0175] When there is no input of an image transcription end key (no [step ST222]), it does not pass to the set-up maximum sound recording time amount (no [step ST224]) and change has not occurred in the content of an image, either (no [step ST226]), the encoding amount of data (amount of data compressed and pack-ized in the formatter section 619) till then has it confirmed by the buffer memory section 620 whether to be constant-rate ***** (step ST 228). (Step ST228 No), when the encoding amount of data collected on the buffer memory section 620 has not reached a constant rate, the processing loop formation of steps ST222-ST228 is repeated until it reaches a constant rate.

[0176] If the encoding amount of data collected on the buffer memory section 620 reaches a constant rate (step ST228 yes), the write-in address and data size of data (pack) of the constant rate will be determined by the file system, and it will be written in a disk 100 by the disk drive section 609 (step ST 230).

[0177] The check of whether at the time of this writing, there is any remaining capacity which can be recorded on videotape on a disk 100 is performed (step ST 232). If it remains in a disk 100 and there is capacity (no [step ST232]), it will return to a step ST 222 and processing of steps ST222-ST230 will be repeated.

[0178] If it remains in a disk 100 and there is no capacity (step ST232 yes), there "there being no

remaining capacity" or the alarm display "there is no image transcription tooth space" will be outputted to a display 608 and/or TV637 (step ST 234), and it will shift to the image transcription post process (step ST 140) of drawing 20 . (Step ST222 Yes), in addition, also when there is an input of an image transcription end key in a step ST 222, it shifts to the image transcription post process (step ST 140) of drawing 20 .

[0179] (Step ST226 Yes), when it passes to the maximum sound recording time amount set up in a step ST 224 (step ST224 yes), or when change arises by the content of an image in a step ST 226, it shifts to the step ST 220 of drawing 19 .

[0180] An encoding termination instruction is published by the audio encoding section 617 at a step ST 220. Then, reading appearance of the data encoded until now is carried out from the buffer memory section 620, and they are written in a disk 100 (the write-in address and data size, i.e., the non-recorded remaining amount of data, are determined by the file system). And the number of packs of VOB (drawing 3) etc. is saved as carving information (VOBI information) at work-piece RAM section 604a. Furthermore, when new grouping is needed with the still picture number-of-sheets upper limit attainment in 1 group, attribute change of a still picture, etc., a VOG part injury line crack and its VOG information (S_VOGI) are created, and it is saved at work-piece RAM section 604a.

[0181] Then, it waits until the frame number specified further passes after change occurs in waiting and the content of an image until change of the content of an image breaks out (step ST236 yes) (step ST238 yes). After doing so, it will return to the step ST 218 of drawing 18 , and the still picture group of the incorporated slide show will be written in a disk 100 by the processing loop formation of steps ST222-ST232.

[0182] In addition, if it confirms whether the image frame of the same content carried out predetermined number continuation in a step ST 238 and the image frame of the same content carries out predetermined number continuation after detecting the content change of an image in a step ST 236 (step ST238 yes), it can also constitute so that it may return to the step ST 218 of drawing 18 .

[0183] In processing of drawing 18 , after the alarm display "there is no remaining capacity" is outputted when there is an image transcription end key input (step ST222 yes) or (step ST 234) and the image transcription post process (step ST 140) of drawing 20 is performed, processing of drawing 18 - drawing 20 is ended.

[0184] In this image transcription post process (step ST 140; equivalent to ST140 of drawing 14) * Carving information (S_VOGI etc.) is constituted and it is investigated whether the stream information STI used for * image transcription is in VMG. When there is nothing, STI used for the image transcription is registered, in a certain case, an applicable STI number is registered into S_VOGI, initialization of * formatter section 619 is performed, and the writing (renewal of VMG) to the VMG file of * image transcription information (PGCI setting out, carving information, etc.) is performed.

[0185] Processing of drawing 18 described above - drawing 20 can realize continuation incorporation of a still picture easily, without applying a troublesome actuation burden to a user.

[0186] Drawing 21 is flow chart drawing explaining the overall regeneration procedure by the equipment of drawing 1 .

[0187] First, the disk 100 with which the disk drive section 609 of drawing 1 was loaded is checked (step ST 300). When a disk 100 is faulty, or when it is the disk of specification which cannot respond by the system of drawing 1 , (NG of a step ST 300) and error processing are performed (step ST 302), and processing of drawing 21 is ended.

[0188] When a disk 100 is normal, it is confirmed whether the volume structure is recorded on (O.K. of a step ST 300) and its disk (step ST 304). (Step ST304 Yes), when the volume structure is recorded, existence of a DVD_RTR directory (drawing 2) is checked (step ST 306).

[0189] When there is no DVD_RTR directory (no [step ST306]), or when the volume structure is not recorded (no [step ST304]), after the message indicator of "not being recorded on videotape" is made (step ST 308), processing of drawing 21 is ended.

[0190] (Step ST306 Yes), when there is a DVD_RTR directory, the existence of error generating is

checked (step ST 310). When an error occurs, after the message indicator of "(Step ST310 Yes), the error occurred with the file system" is made (step ST 312), processing of drawing 21 is ended.

[0191] (Step ST310 No), when errorless, it is confirmed whether a VMG file is in a disk 100 (step ST 314). When there is a VMG file, the content of the (step ST314 yes) VMG file is read (step ST 318), and it is confirmed whether there are any VRO files, such as VR_MOVIE.VRO as shown there at drawing 2, VR_STILL.VRO, and VR_AUDIO.VRO, (step ST 320).

[0192] When there is no VRO file (no [step ST320]), or when there is no VMG file (no [step ST314]), after the message indicator of "not being recorded on videotape" is made (step ST 316), processing of drawing 21 is ended.

[0193] (Step ST320 Yes), when there is a VRO file, the program number and cel number which carry out playback initiation are chosen by the user etc., and are determined (step ST 322).

[0194] if the program number and cel number which carry out playback initiation are determined -- the video decoding section 628 of drawing 1, SP decoding section 627, and the audio decoding section 630 -- each initial setting is performed (step ST 324). In this initial setting, the video decoding section 628 is set as a still picture playback mode (still picture mode), disregards the STC section 650, and comes to perform I picture playback of MPEG video.

[0195] It goes into cel regeneration of a still picture etc. after that (step ST 330). The detail of this cel regeneration is later mentioned with reference to drawing 22 and drawing 23.

[0196] (Step ST332 No), while cel playback is continuing, from PGCI, the following playback cel is set up (step ST 334), and repetitive activation of the cel regeneration of a step ST 330 is carried out.

[0197] Termination of cel playback checks generating of an error (step ST 336). (step ST332 yes) If errorless (no [step ST336]), after processing at the time of other playback termination will be performed (step ST 338), processing of drawing 21 is ended. When there is an error, after the message indicator of "(Step ST336 Yes), the read-out error occurred" is made (step ST 340), a playback post process is performed (step ST 342), and a return is carried out to other manipulation routines.

[0198] Drawing 22 and drawing 23 are flow chart drawings explaining the concrete content of processing of the processing at the time of the cel playback in the procedure of drawing 21 (step ST 330).

[0199] In drawing 22, the starting position (FP) of the cel which it is going to reproduce is determined from the content of PGCI of drawing 4, and S_AVFIT of drawing 7 (step ST 3300). This location (FP) is expressed with a logical-block number (LBN).

[0200] In processing of this step ST 3300, the number of the video object VOB which starts playback is set as a parameter "n", the video object group's VOG stream information STI to reproduce is read into work-piece RAM section 604a, and they are set as each decoding sections 627-630.

[0201] Next, the temporary erasion flag which shows an elimination condition temporarily is taking lessons from VOB which it is going to reproduce, and it is checked whether the flag is turned on (step ST 3302). The condition of this temporary erasion flag-on is equivalent to the condition that the file of Relevance VOB was thrown away into the garbage can icon.

[0202] Although VOB of temporary erasion flag-on was not necessarily eliminated actually yet, it is removed for playback. If the temporary erasion flag of the present VOB is ON (step ST3302 yes), processing will jump to the step ST 3336 of drawing 23 mentioned later.

[0203] If the temporary erasion flag of current VOB is off (no [step ST3302]), the starting position (FP) of n-th VOB which it is going to reproduce will be determined from the content (stream information STI including the attribute information on the VOB number n, and video/audio to reproduce) of PGCI and S_AVFIT (step ST 3304).

[0204] Next, the judgment of which [of Type A of drawing 8 - drawing 11 - Type D] is entry type VOB_ENT of n-th determined VOB is performed (step ST 3310).

[0205] If VOB_ENT is Type A, from RTR_VMGI of drawing 4 (a), reading appearance of the information (STILL_TM) on the still time (still picture display time) which is not illustrated will be carried out, it will be set up (step ST 3312), and a data read-out instruction will be set to the disk drive section 609 (step ST 3324).

[0206] If VOB_ENT is Type B, a still time will be set as 0xFFFF (audio playback time amount), and it will be set up so that the audio on which the still picture was overlapped may be reproduced (step ST 3314). And after the playback time stamp PTS of audio initiation is set as the STC section 650 (step ST 3322), a data read-out instruction is set to the disk drive section 609 (step ST 3324).

[0207] When VOB_ENT is Type C, a still time is set as 0xFFFF (audio playback time amount), and it is set up so that an ADISHONARU audio (addition audio AA) may be reproduced (step ST 3316). In that case, it is set up so that the transfer ending address of Relevance VOB may serve as only video PERT. Then, processing shifts to a step ST 3322.

[0208] When VOB_ENT is Type D, it is confirmed whether the ADISHONARU audio is chosen first (step ST 3318). If the ADISHONARU audio is chosen (step ST3318 yes), processing will shift to a step ST 3316. If the ADISHONARU audio is not chosen (no [step ST3318]), a still time will be set as 0xFFFF (audio playback time amount), and it will be set up so that the audio on which the still picture was overlapped may be reproduced (step ST 3320). Then, processing shifts to a step ST 3322.

[0209] If a data read-out instruction is set to the disk drive section 609 in drawing 22 (step ST 3324), processing will shift to the step ST 3326 of drawing 23. At a step-ST 3326, it is confirmed whether the data transfer to the disk drive section 609 was started.

[0210] Initiation of data transfer performs the check of whether to also transmit the data of an ADISHONARU audio (step ST 3328). (step ST3326 yes)

[0211] (Step ST3328 Yes), when transmitting the data of an ADISHONARU audio, the ADISHONARU audio starting position (FP) and termination location (FP) which are attached to n-th VOB_ENT which it is going to reproduce from the content of PGCI and S_AVFIT are determined (step ST 3330).

[0212] Then, a starting position (FP) and a termination location (FP) are changed into a physical address by the file system, and an instruction of data read-out is set to the disk drive section 609 based on the physical address data (step ST 3332).

[0213] In this way, termination of the data transfer reading appearance was carried out [the data transfer] by the disk drive section 609 confirms whether there was a certain user key input from the key input section 607 or the remote controller which is not illustrated (step ST 3336). (step ST3334 yes)

[0214] (Step ST3336 Yes and ST3338 yes), when there is a stop key input from a user, a return is carried out to processing of a playback stop. If there is no key input in any way from a user (no [step ST3336]) and playback time amount is not ended, either (no [step ST3342]), the processing loop formation of steps ST3336 and ST3342 is repeated. In addition, the judgment in a step ST 3342 is performed by whether the playback time amount was completed at the time of audio playback, and is performed by whether still time amount (still picture playback time amount) was completed at the time of other playbacks.

[0215] (Step ST3342 Yes), on the other hand, when there is not a stop key input but a play key input from a user (no [ST3338], ST3340 yes [step ST3336 yes,]), or when playback time amount is completed at a step ST 3342, the increment of the parameter "n" set up at the step ST 3300 of drawing 22 is carried out (step ST 3344).

[0216] In this way, if "n" by which the increment was carried out is less than the total number of pictures in a cel (no [step ST3346]), it will return to the step ST 3302 of drawing 22, and processing of ST3302-ST3346 will be repeated.

[0217] On the other hand, if "n" by which the increment was carried out exceeds the total number of pictures in a cel (step ST3346 yes), it will end and the return of the regeneration of drawing 22 and drawing 23 will be carried out to other processings.

[0218]

[Effect of the Invention] As explained above, even if a user does not choose and set up the one-sheet incorporation still picture of one sheet in detail, according to this invention, the digital image information equipment with a still picture continuation taking-in function which can carry out the continuation incorporation of two or more still pictures simply can be obtained from a video signal.

[0219] Moreover, even if a user does not choose and set up the one-sheet incorporation still picture of one sheet in detail, the two or more still picture record approach which can carry out continuation record of

two or more still pictures simply can be acquired from a video signal.

[Translation done.]

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EFFECT OF THE INVENTION

[Effect of the Invention] As explained above, even if a user does not choose and set up the one-sheet incorporation still picture of one sheet in detail, according to this invention, the digital image information equipment with a still picture continuation taking-in function which can carry out the continuation incorporation of two or more still pictures simply can be obtained from a video signal.

[0219] Moreover, even if a user does not choose and set up the one-sheet incorporation still picture of one sheet in detail, the two or more still picture record approach which can carry out continuation record of two or more still pictures simply can be acquired from a video signal.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] By the way, by RTR-DVD specification, the a maximum of 63936-sheet (= maximum number of sheets 64 in maximum number 999x video object group of still cel) record of the still picture (still picture) can be carried out. An electronic "still" camera (digital camera) etc. can be considered as the source of this still picture. In this electronic "still" camera, semiconductor memory, such as an IC card, is used as a record medium of the photoed still picture.

[0007] On the other hand, disk media, such as an optical disk, are used for a RTR-DVD videocassette recorder. That is, the record medium used with an electronic "still" camera and a RTR-DVD videocassette recorder is different. For this reason, it is not easy to be crowded direct picking in a RTR-DVD videocassette recorder in the still picture data created with the electronic "still" camera.

[0008] Moreover, when incorporating two or more still pictures from a video signal (video signal containing two or more still picture group created on a motion-video signal, a usual electronic "still" camera, or a usual digital video movie), whenever the content of an image changes, a user has to choose and set up the one-sheet incorporation still picture of one sheet, and there is a trouble of taking time and effort dramatically.

[0009] This invention aims at offering the digital image information equipment with a still picture continuation taking-in function which can incorporate two or more still pictures continuously from a video signal, even if it was made in view of the above-mentioned situation and a user does not choose and set up the one-sheet incorporation still picture of one sheet in detail.

[0010] Other objects of this invention are offering the two or more still picture record approach which incorporates two or more still pictures continuously, and records them from a video signal, even if a user does not choose and set up the one-sheet incorporation still picture of one sheet in detail.

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MEANS

[Means for Solving the Problem] In order to attain the above-mentioned object, the digital image information equipment concerning this invention The key input section which specifies still picture continuation incorporation mode (607); After shifting to this still picture continuation incorporation mode, The information from this detection section The frame change detection section as which the incorporated frame detects that a front frame and the front content of an image differ from each other from the inputted video signal (604); to origin The incorporated frame data are compressed into I picture of MPEG. The encoder section which generates the pack structure specified by RTR-DVD specification (601); information about I picture generated in this encoder section is consisted of by the playback management information creation section (604) which creates playback management information (S_VOG_GI).

[0012] moreover, in order to attain the object besides the above, by the two or more still picture record approach concerning this invention the still picture group (VOG) of two or more still pictures within predetermined number of sheets (64 sheets) -- setting up --; (ST114 of drawing 14 ; ST214 of drawing 18) -- after image transcription initiation of said image information (ST116 yes; of drawing 14 ST216 yes of drawing 18) Record of said two or more still pictures contained in said image information is continuously performed to said data-logging area of said information media (100) (the image transcription processing loop formation containing ST118 of drawing 14 ; image transcription processing loop formation containing ST218 of drawing 18); record said two or more still pictures carried out the management information (VOG information; S_VOG_GI of drawing 13) summarized in said every still picture group (VOG) -- creating --; (ST120 of drawing 14 ; ST220 of drawing 19) -- in the management information record area (VMG/S_AVFIT) of said information media (100) of said two or more still pictures in said created management information (S_VOG_GI) is written in (ST140 of drawing 14 ; ST140 of drawing 20) -- it is made like.

[0013] By carrying out like this, two or more still pictures can be automatically incorporated continuously from the video signal containing two or more still pictures by which continuation playback is carried out like a slide show, and the system recorded in a RTR-DVD format can be built.

[0014]

[Embodiment of the Invention] Hereafter, with reference to a drawing, the digital image information equipment with a still picture continuation taking-in function concerning the gestalt of 1 implementation of this invention is explained.

[0015] Drawing 1 is a block diagram explaining the whole digital image information equipment (RTR-DVD videocassette recorder) configuration with a still picture continuation taking-in function concerning the gestalt of 1 implementation of this invention.

[0016] The body of equipment of the RTR-DVD videocassette recorder shown in drawing 1 is said roughly, carries out revolution actuation of the rec/play possible optical disks 100, such as DVD-RAM, DVD-RW, or DVD-R, and consists of the disk drive section 609 which performs informational R/W to this disk 100, the encoder section 601 which constitutes an image transcription side, the decoder section 602 which constitutes a playback side, and a Main MPU section 604 which controls actuation of the whole equipment.

[0017] Furthermore, the recorder unit 700 which used the high-speed (a data transfer rate an IEEE1394 serial bus and more than equivalent; specifically 400Mbps(es) - 500Mbps class) hard disk drive (HDD) with large capacity (for example, 30GB - 100GB or more than it) is connectable with the data bus which connects the disk drive section 609 and the Main MPU section 604.

[0018] Although this mass high-speed HDD recorder unit 700 is not necessarily required, if the disk drive section 609 and the HDD recorder units 700, such as DVD-RAM, are unified depending on the gestalt of implementation of this invention, the following will become possible, for example.

[0019] That is, an air check of the TV program etc. is carried out by the HDD recorder unit 700. If there are some programs (program contents to which the copy limit is not carried out) which think that a user does not want to erase among the programs which carried out an air check, after carrying out connector edit setting out of them suitably, it will copy to a DVD-RAM disk, a DVD-RW disk, or a DVD-R disk (backup). Then, the permanent preservation of a request program which carried out an air check by the HDD recorder unit 700 is attained, and a part to have copied to the disk on the other hand can make elimination possible from the HDD recorder unit 700 (the file of the copied program is thrown away into a garbage can icon). Then, a subsequent image transcription tooth space can be secured to the HDD recorder unit 700 now by the file size thrown away into the garbage can icon at an excess.

[0020] Or the air check of TV program can be performed by the mass (availability is 30GB) HDD recorder unit 700, and can also copy behind the long form which carried out an air check from the HDD recorder unit 700 to the DVD-RAM disk of two or more sheets for a long time which has not been settled, for example in one DVD-RAM disk of 4.7GB capacity. If it does in this way, the air-check leakage produced during the period which disk-swapping (or change of the disk for an image transcription) takes (several seconds - about dozens of seconds) can be prevented.

[0021] Or mixture record of a DVD-VR video signal, a DVD-AR audio signal, and the DVD-SR stream signal is carried out at arbitration at the HDD recorder unit 700. And it was also able to be said that only a DVD-VR video signal was copied to a certain DVD-RAM disk from the HDD recorder unit 700, only a DVD-AR audio signal was behind copied to other DVD-RAM disks, and only a DVD-SR stream signal was copied to the DVD-RAM disk of further others.

[0022] In addition, the HDD recorder unit 700 is not built in the equipment of drawing 1, but this equipment is considered as the configuration only for optical disk recorders, and you may make it prepare the IEEE1394 interface for HDD recorder unit 700 connection (or the tooth space and its connection slot for equipping with an HDD recorder unit behind) in this equipment.

[0023] The encoder section 601 of drawing 1 is equipped with the A/D-conversion section 614, the video encoding section 616, the audio encoding section 617, the sub(image SP) encoding section 618, the formatter section 619, and the buffer memory section 620.

[0024] The analog TV signal + analog sound signal from the external analog video signal + external analog audio signal or TV tuner section 613 from AV input section 612 etc. is inputted into the A/D-conversion section 614. This A/D-conversion section 614 digitizes the inputted analog video signal with the sampling frequency of 13.5MHz, and the quantifying bit number of 8 bits. Similarly, the A/D-conversion section 614 digitizes the inputted analog audio signal with the sampling frequency of 48kHz, and the quantifying bit number of 16 bits.

[0025] In addition, when an analog video signal and a digital audio signal are inputted into the A/D-conversion section 614, the A/D-conversion section 614 carries out the through pass of the digital audio signal. On the other hand, when a digital video signal and a digital audio signal are inputted into the A/D-conversion section 614, the A/D-conversion section 614 carries out the through pass of a digital video signal and the digital audio signal.

[0026] The digital video signal component from the A/D-conversion section 614 is sent to the formatter section 619 through the video encoding section 616. Moreover, the digital audio signal component from the A/D-conversion section 614 is sent to the formatter section 619 through the audio encoding section 617.

[0027] The video encoding section 616 has the function to change the inputted digital video signal into the

digital signal compressed with the Variable Bit Rate based on MPEG 2 (or MPEG1) specification.

Moreover, the audio encoding section 617 has the function to change the inputted digital audio signal into the digital signal (or digital signal of Linear PCM) compressed with the fixed bit rate based on MPEG or AC-3 specification.

[0028] When a DVD video signal is inputted from AV input section 612, or when a DVD video signal is broadcast and it is received in TV tuner section 613, the teletext signal component in a DVD video signal (or the closed caption CC) is inputted into SP encoding section 618. The subimage data inputted into SP encoding section 618 are arranged by predetermined signal aspect, and are sent to the formatter section 619.

[0029] Using the buffer memory section 620 as a work area, the formatter section 619 performs predetermined signal processing to the inputted video signal, an audio signal, a subvideo signal, etc., and outputs the record data corresponding to a predetermined format (file structure) to the data-processor section (D-PRO section) 610.

[0030] Here, the standard content of encoding processing for creating the above-mentioned record data is explained briefly. That is, if encoding processing is started in the encoder section 601 of drawing 1, a required parameter will be set up in encoding of a video data and others. Next, the PURIEN code of the main image data is carried out using the set-up parameter, and distribution of the optimal amount of signs for the set-up average transfer rate (record rate) are calculated. In this way, encoding of the main image is performed based on the amount distribution of signs obtained in PURIEN code. At this time, encoding of audio data is also performed simultaneously.

[0031] the result of a PURIEN code -- case (the DVD-RAM disk which it is going to record on videotape --) the amount of data compressions is inadequate When the video program of hope has not been settled in a DVD-RW disk, a DVD-R disk, or the HDD recorder unit 700, If it can have an opportunity to carry out a PURIEN code again, (if the source of an image transcription is the source in which repeated regeneration, such as a video tape or a videodisk, is possible) Partial re-encoding of the main image data is performed, and the main image data of the re-encoded part are permuted by part for the main image data division which carried out the PURIEN code before it. The main image data and audio data are encoded by such a series of processings, and the value of an average bit rate required for record is substantially reduced by them.

[0032] A parameter required to encode subimage data similarly is set up, and the encoded subimage data are created.

[0033] The main image data, audio data, and subimage data which were encoded as mentioned above are put together, and it is changed into the structure of RTR-DVD video.

[0034] The main image data, audio data, and subimage data which were encoded are subdivided by the pack of fixed size (2048 bytes) as shown in the lower berth of drawing 3. The dummy pack which is not illustrated is suitably inserted in these packs. In addition, in packs other than a dummy pack, time stumps, such as PTS (presentation time stump) and DTS (decoding time stump), are described suitably. About PTS of a subimage, the time amount which delayed arbitration from PTS of the main image data of the same playback time zone or audio data can be described.

[0035] And in order of the time code of each data, each data cell is arranged per video object unit (VOBU), and VOB which consists of two or more cels is constituted so that it may be refreshable. The VR_MOVIE.VRO file which summarized this VOB one or more, a VR_STILL.VRO file, a VR_AUDIO.VRO file, etc. are formatted by the directory structure of drawing 2.

[0036] In addition, since the content of a cel, a program chain, a managed table, the time stump, etc. had been decided since the start when the digital copy of the regenerative signal of DVD video was able to be carried out, it is not necessary to create these anew. However, in order to constitute a RTR-DVD videocassette recorder so that the digital copy of the DVD regenerative signal can be carried out, the suitable copyright safeguard needs to be provided.

[0037] The D-PRO section 610, the memory section 611, and system time counter (or system time clock) STC section 650 grade are connected to the disk drive section 609 which performs informational R/W (an

image transcription and/or playback) to the DVD disk (DVD-RAM, DVD-RW, DVD-R, DVD-ROM) 100.

[0038] The D-PRO section 610 follows control of the Maine MPU section 604. Supply the RTR-DVD record data from the encoder section 601 to the disk drive section 609 and/or the HDD recorder unit 700, or Take out a RTR-DVD regenerative signal from a disk 100 or the HDD recorder unit 700, or The management information (some file data of drawing 2) recorded on the disk 100 is rewritten, or the data (a part of file or all) recorded on the disk 100 are deleted (processing which throws away a file into a garbage can icon).

[0039] The memory section 611 buffers a part for the constant rate of the data (data outputted from the encoder section 601) written in a disk 100 through the disk drive section 609, or is used for buffering a part for the constant rate of the data (data inputted into the decoder section 602) reproduced from the disk 100 through the disk drive section 609.

[0040] For example, when the memory section 611 consists of semiconductor memory (DRAM) which is 4 M bytes, the record for about 8 seconds or buffering of playback data is possible at the record rate of an average of 4 Mbps(es). Moreover, when the memory section 611 consists of EEPROMs (flash memory) which are 16 M bytes, buffering of the record for about 30 seconds or playback data is possible at the record rate of an average of 4 Mbps(es). Furthermore, it is also possible to use a part of record area of the HDD recorder unit 700 for buffering of playback data, for example.

[0041] The memory section 611 (or HDD recorder unit 700) can be used for storing temporarily image transcription information until it is exchanged for a disk with a new disk 100 when the disk 100 has been exhausted in the middle of an image transcription.

[0042] Moreover, the memory section 611 can be used also for storing temporarily the data by which reading appearance was more nearly usually than a drive carried out to the excess into fixed time amount when a high-speed drive (two X or more) is adopted as the disk drive section 609. Even when the reading data at the time of playback were buffered in the memory section 611, the optical pickup which is not illustrated with an oscillating shock etc. reads and an error is caused, a playback image can be prevented from breaking off by using it, changing the playback data buffered by the memory section 611.

[0043] Although not illustrated in drawing 1 , if the external card slot is prepared in the RTR-DVD videocassette recorder, Above EEPROM can carry out an option as an IC card of an option. Moreover, if the external drive slot or the USB interface is prepared in the RTR-DVD videocassette recorder, the option of the above HDD can be carried out as an extended drive of an option.

[0044] In addition, in the case (not shown) where a personal computer with a DVD-RAM drive is formed into a RTR-DVD videocassette recorder by software, a part of free area of the own hard disk drive of a personal computer or a part of main memory can be used as the memory section 611 of drawing 1 .

[0045] The Maine MPU section 604 of drawing 1 contains program ROM section 604c in which the control program (processing of drawing 14 - drawing 23) etc. was written other than the microcomputer (MPU or CPU) which is the core, character ROM section 604b of the kanji and others, work-piece RAM section 604a which offers a work area required for program execution (activation of processing of drawing 14 - drawing 23).

[0046] This Maine MPU section 604 contains the directory detection section 6041 which detects further the directory (hierarchical file structure as shown in drawing 2) of the data file recorded on the disk 100 (or HDD recorder unit 700) of drawing 1 , and the video object grouping section (VOG-ized section) 6043 mentioned later. These directory detection section 6041 and the VOG-ized section 6043 are physically written in program ROM section 604c as a firmware which the Maine MPU section 604 performs.

[0047] MPU of this Maine MPU section 604 performs processing of drawing 14 - drawing 23 mentioned later according to the control program stored in that ROM, using that RAM as a work area.

[0048] In these processings, the Maine MPU section 604 is provided with the data (an instruction of various processings, the chart lasting time of a still picture to carry out continuation incorporation, an initiation instruction of still picture continuation incorporation, text input about the content of an image transcription, etc.) which the user of a RTR-DVD videocassette recorder inputs from the key input section

607. As this key input section 607, although not illustrated, the keyboard of a personal computer, or a cursor key/ten key of remote control can be used.

[0049] The content of which the user of a RTR-DVD videocassette recorder should be notified among the activation results of the Maine MPU section 604 is displayed on the display 608 of a RTR-DVD videocassette recorder. And this content of advice is suitably displayed on a monitor display using an onscreen display (OSD), a subimage, etc.

[0050] In addition, the Maine MPU section 604 can determine the timing which controls the disk drive section 609, the D-PRO section 610, the encoder section 601, and/or the decoder section 602 based on the time data from the STC section 650 (although actuation of an image transcription and playback is usually performed synchronizing with the timer clock from the STC section 650, the other processing may be performed to the timing which became independent in the STC section 650).

[0051] Moreover, the Maine MPU section 604 can also perform now processing of the image transcription time of each program recorded on the disk 100, the registration time of an entry point, etc. based on the time data from the timer clock generating section which is not illustrated.

[0052] The separation section 625 which the decoder section 602 of drawing 1 separates each pack from RTR-DVD playback data with pack structure as shown in drawing 3, and is taken out, The memory 626 used at the time of signal-processing activation of pack separation and others, and the video decoding section 628 which decodes the main image data (the content of the video pack) separated in the separation section 625, The sub(image SP) decoding section 627 which decodes the subimage data (the content of the subimagery pack) separated in the separation section 625, The audio decoding section 630 which decodes the audio data (the content of the audio pack) separated in the separation section 625, The subimage data from SP decoding section 627 are suitably compounded from the video decoding section 628 to a video data. The video processor (V-PRO) section 638 which outputs the subimage of a menu, a highlights carbon button, and a title and others to the main image in piles, It has the D/A converter (for audios) 632 which changes the digital audio output from the audio decoding section 630 into an analog audio signal.

[0053] Here, the video decoding section 628 contains cutback image (thumbnail picture) generation section 628a. This generation section 628a reduces the read image data, transmits it to the frame memory section 606, and it is constituted so that a cutback image (thumbnail picture) can be outputted to the external monitor TV 637.

[0054] The OSD data (text etc.) suitably supplied from the main image data (cutback image data is included suitably) and the Maine MPU section 604 which are outputted from the V-PRO section 638 are inputted into the video mixing section 605. This OSD data is superimposed on the frame memory section 606 by the main image data from the V-PRO section 638. The main image data with which it was superimposed on this OSD data are outputted from the video mixing section 605.

[0055] The digital video output from the video mixing section 605 is changed into an analog video signal by the D/A converter 636, and is supplied to the external monitor TV 637 while an external output is carried out through digital output I/F634. Then, various text information etc. is displayed on TV637 with the main image.

[0056] The digital audio output from the audio decoding section 630 is changed into an analog audio signal by the D/A converter 632, and is supplied to an external speaker 633 while an external output is carried out through digital output I/F631.

[0057] It is as follows when the example of the equipment of drawing 1 of operation is summarized simply. That is, the analog AV signal inputted from the A/V input section 612 is digital-signal-ized in the A/D-conversion section 614. A video signal is inputted into the video encoding section 616 among the digital signal, an audio signal is inputted into the audio encoding section 617, and alphabetic data, such as a teletext, is inputted into SP encoding section 618. MPEG compression of the video signal inputted into the video encoding section 616 is carried out, the audio signal inputted into the audio encoding section 617 is AC-3-compressed or MPEG audio compressed, and run length compression of the alphabetic data (bit map data) inputted into SP encoding section 618 is carried out.

[0058] Furthermore, from each encoder sections 616-618, when various compressed data is pack-ized, it is

packet-ized so that it may become 2048 bytes, and is inputted into the formatter section 619. In the formatter section 619, it is pack-ized, and further, each packet is multiplexed and is sent to the D-PRO section 610.

[0059] When 1 GOP at this time, for example, MPEG, is set as the encoder section 601 as VOB which is the data unit of DVD video, the carving information at that time is saved in the buffer memory section 620. If this carving information accumulates to some extent in the buffer memory section 620, it will be transmitted to the Main MPU section 604. The Main MPU section 604 creates time map information based on the transmitted information. (This time map information is sent out at the times, such as GOP head interruption.) I picture which is here and corresponds to that VOB as the above-mentioned carving information from the magnitude of VOB, the playback time amount from a VOB head to that VOB last, and a VOB head -- and -- up to the address -- etc. -- it thinks.

[0060] Moreover, based on the above-mentioned carving information, the formatter section 619 creates time map information, and passing it to the Main MPU section 604 in the form of a time map is also considered directly.

[0061] The D-PRO section 610 divides each encoded data pack train every 16 packs, forms an ECC block, attaches error correction data to the ECC block, and records it on the optical disks 100, such as DVD-RAM, by the disk drive section 609.

[0062] Here, when the disk drive section 609 will be in busy status for a track jump etc. during seeking, the digital signal stream of the ECC block with error correction data is stored temporarily in the memory section 611, and it will wait for it until it is [record] ready for the disk drive section 609.

[0063] Here, in the real-time DVD recorder of drawing 1 using DVD-RAM etc., processing of a still picture can be performed as follows, for example.

[0064] For example, if the video signal of a still picture is inputted into the A/V input section 612 after shifting to a still picture recording mode with the user directions from the key input section 607, the MPEG video encoding section 616 will compress the incorporated still picture data as I picture data, will add a sequence end code after the compressed data further, and will change it into pack structure. This I picture data of one sheet is recorded as 1 VOB=1 VOB, as shown in drawing 3.

[0065] Furthermore, when two or more still pictures are incorporated, a group is formed with the still picture of less than 64 sheets, and it is referred to as VOG (video object group). This VOG is a break on management and is equivalent to VOB in animation playback.

[0066] To this incorporated still picture, management information (S_AVFI/S_VOGI) is built for every VOG, and the management information (program chain information) which determines the order of playback of incorporated two or more still pictures is registered into ORG_PGCI.

[0067] Although later mentioned with reference to drawing 16 as conditions for forming VOG at this time When record number of sheets reaches fixed numbers (usually 64 sheets) and the recording mode of a still picture is changed, When a user presses the grouping key (key contained in the key input section 607 of drawing 1) which is not illustrated (under still picture continuation record) and a record date is set up, the case where the date changes etc. can be considered.

[0068] Actually, it is the combination of the above-mentioned conditions and VOG can carve.

[0069] Modification of the resolution of a still picture, the change of the monochrome / stereo / dual monochrome of the audio reproduced in connection with the still picture, modification of the compression method of the audio reproduced in connection with the still picture, modification of the pallet data of the subimage reproduced in connection with the still picture, etc. can be considered to be the cases where the recording mode of a still picture is changed among the above-mentioned conditions.

[0070] The information about these recording-mode modification is recorded on management information S_VOB_STI later mentioned with reference to drawing 13, and can process now the information about recording-mode modification by recording the stream information number (S_VOB_STIN) of an applicable recording mode on S_VOG_GI of drawing 12 mentioned later.

[0071] Drawing 2 is drawing explaining the directory structure of the digital information file recorded on the information medias (DVD-RAM, DVD-RW, DVD-R, HDD, etc.) of drawing 1.

[0072] Two or more specification exists in DVD, and the directory exists for every specification. That is, by DVD video, the directory of DVD_RTAV210 is prepared in the directory of AUDIO_TS220, and RTR-DVD (rec/play DVD) in the directory (not shown) of VIDEO_TS, and a DVD audio. And the record data of each specification exist in the file of a corresponding directory.

[0073] By DVD video, data are saved by the usual file format. Each title recorded on DVD video is equivalent to one duty of a film, and this or more 1 close title is in the disk of one sheet. That for which this title gathered is called title set, and this title set consists of multiple files.

[0074] The title set (VTS) consists of a management information file which the information for managing this title set calls video title set information (VTSI), a video file which consists of video datas, and a backup file of VTSI. Furthermore, by DVD video, the management information file called a video manager (VMG) as information for managing this disk exists in the disk of one sheet.

[0075] On the other hand, in RTR-DVD (rec/play DVD), as shown in drawing 2, the VR_MOVIE.VRO file 231 and the data file VR_STILL.VRO file 232 for still pictures which are one data file for animations exist in one disk, and the management information (video manager VMG) VR_MANGR.IFO file 230 for managing these video-data files is recorded.

[0076] moreover -- the specification of Rec/play DVD -- VMGI and VTSI of said DVD video -- together -- carrying out -- the overall management information VMG -- constituting -- this VMG -- a video-data file -- managing -- **** .

[0077] In addition, by the RTR-DVD recorder of drawing 1 concerning the gestalt of 1 implementation of this invention, the video file for animations (VR_MOVIE.VRO231 of drawing 2) and the data file for still pictures (VR_STILL.VRO232 of drawing 2) are taken as one file each at one disk.

[0078] Said video-data file is managed by the layered structure, as shown in drawing 2, one video object set (VOBS) consists of one or more VOB(s), and one VOB consists of one or more video object units (VOBU). Moreover, each VOBU is constituted by two or more packs which consist of data of various classes. One pack consists of a pack header and one or more packets, and each video data and audio data are recorded in this packet.

[0079] Drawing 3 is drawing explaining the DS of the video object set (VOBS) included in the digital information (an animation, a still picture, voice, subimage, etc.) recorded on the information medias (DVD-RAM, DVD-RW, DVD-R, HDD, etc.) of drawing 1. Information contents, such as a video data, still picture data, voice data, and subimage data, are recorded on this VOBS.

[0080] Here, about still picture data, it is managed as one I picture = 1 ** VOB [VOBU=1 **], and continues after the video-data pack (V pack) train with the subimagery pack (SP pack) train and the audio pack (A pack) train so that it may be illustrated by drawing 3. However, in the case of still picture data, subimage data and/or audio data are options, and there may be. [no]

[0081] Here, a pack is a smallest unit which performs data transfer processing. Furthermore, the smallest unit which performs processing on logic is a cel unit, and processing on logic is performed per cel. And the playback sequence of a cell data is defined by the program chain (PGC). Two or more programs (PG) are registered into this PGC, and one or more cels are registered into this PG. The program chain information (PGCI) included in said VMG has recorded this structure of PGC actually. Regeneration is performed according to this PGCI and PGCI is created at the time of record or edit.

[0082] Drawing 4 is drawing explaining the DS of the management information (VMG/PGCI/CI) used by the information medias (DVD-RAM, DVD-RW, DVD-R, HDD, etc.) of drawing 1. In RTR-DVD (rec/play DVD), the management information VMG of structure as shown in drawing 4 is used.

[0083] In drawing 4 (a), the fundamental information on the record refreshable optical disk (RTR disk) 100 of drawing 1 is described by RTR video manager information RTR_VMGI. This RTR_VMGI contains video manager information management table VMGI_MAT and play list search pointer table PL_SRTP.

[0084] RTR_VMGI contains movie AV file information table M_AVFIT, still drawing AV file information table S_AVFIT, original copy PGC information ORG_PGCI, custom PGC information table UD_PGCI, text data manager TXTDT_MG, and the manufacturer information table MNFIT further.

[0085] Drawing 4 (b) shows the DS of UD_PGCIT of drawing 4 (a). UD_PGCIT contains custom PCG information table information UD_PGCITI, one or more custom PGC search pointer UD_PGCI_SRP#1 - UD_PGCI_SRP#n, and one or more custom PGC information UD_PGCI#1 - UD_PGCI#n.

[0086] The program chain numbers PGCN from 1 to 99 are assigned to all UD_PGC in written sequence of UD_PGCI_SRP in UD_PGCIT. Each PGC can be specified by this PGCN. Here, UD_PGCITI contains UD_PGCI_SRP_Ns which shows the number of UD_PGCI_SRP, and UD_PGCIT_EA which shows the ending address of UD_PGCIT.

[0087] In addition, the maximum of UD_PGCI_SRP_Ns is set as "99." The ending address of UD_PGCIT is expressed that UD_PGCIT_EA is also at the relative cutting tool number from the cutting tool of the beginning of UD_PGCIT.

[0088] Moreover, UD_PGCI_SRP contains starting address UD_PGCI_SA of UD_PGCI. The starting address of UD_PGCI is expressed that this UD_PGCI_SA is also at the relative cutting tool number from the cutting tool of the beginning of UD_PGCIT.

[0089] In Rec/play DVD, PGC special [for carrying out cel playback] to the order of record is called an original copy PGC, and the information on this original copy PGC is recorded on ORG_PGCI. Moreover, PGC for carrying out cel playback in the sequence which the user set to arbitration after record is called custom PGC, and information UD_PGCI of one or more custom PGC is recorded on UD_PGCIT. VOB of itself does not have custom PGC, but it is constituted so that VOB in an original copy PGC may be referred to.

[0090] Drawing 4 (c) shows the DS of ORG_PGCI of drawing 4 (a), and each UD_PGCI of drawing 4 (b). Each PGCI includes the navigation information for the program chain PGC.

[0091] As shown in drawing 4 (c), PGC information (PGCI) contains PGC general information PGC_GI, cel information search pointer table CI_SRPT which consists of a program information table PGIT which consists of one or more program information PGI, and one or more cel information search pointer CI_SRP, and the cel information table CIT which consists of one or more cel information CI.

[0092] Drawing 4 (d) shows the DS of the cel information table CIT of drawing 4 (c). This CIT consists of cel information CI#1 - CI#j. Here, CI_SA described that the starting address of each cel information CI is also at the relative cutting tool number from the cutting tool of the beginning of PGCI can show.

[0093] Drawing 4 (e) shows the DS of each cel information CI on drawing 4 (d). Each CI contains cel general information C_GI and one or more cel entry point information C_EPI#1 - C_EPI#k so that it may illustrate.

[0094] Drawing 5 is drawing explaining the content of cel general information C_GI (still picture cel general information S_C_GI) contained in the management information (CI) of drawing 4 .

[0095] This C_GI contains the cel type (C_TY) which described the format of an applicable cel, a VOB group's still picture VOB group information search pointer number (S_VOVI_SRPN) used by this cel, the number (C_EPI_Ns) of the cel entry point information in this cel, the starting address (S_S_VOB_ENTN) of the still picture VOB entry number of this cel, and the ending address (E_S_VOB_ENTN) of the still picture VOB entry number of this cel.

[0096] Drawing 6 is drawing explaining the content of cel entry point information C_EPI (still picture cel entry point information S_C_EPI) contained in the management information (CI) of drawing 4 .

[0097] This C_EPI includes the entry point type (EP_TY) which described the format of an entry point, the entry number (S_VOB_ENTN) of a still picture VOB, and primary text information (PRM_TXTI). The flag which shows the existence of PRM_TXTI is described by EP-TY. The number of initiation S_VOB is described by S_VOB_ENTN. In PRM_TXTI, the information on the comment related to a corresponding still picture and others can be described.

[0098] A record format of the carving information used with the equipment of drawing 1 is shown in drawing 7 - drawing 11 .

[0099] Drawing 7 is drawing explaining the DS of the management information (VMG/S_AVFIT/S_AVFI/S_VOVI) of the still picture used by the information medias (DVD-RAM, DVD-RW, DVD-R, HDD, etc.) of drawing 1 .

[0100] VMG of drawing 7 (a) has the same DS as VMG of drawing 4 (a). The still picture AV file information table (S_AVFIT) contained in VMG of drawing 7 (a) contains still picture AV file information table information (S_AVFITI), the stream information on a still picture VOB (S_VOB_STI#1-#n), still picture AV file information (S_AVFI), the stream information on the addition audio to a still picture (S_AA_STI#1-#m), and the file information (S_AAFI) of the addition audio to a still picture, as shown in drawing 7 (b).

[0101] In addition, each S_AA_STI of drawing 7 (b) includes the audio attribute information on an addition audio stream.

[0102] S_AVFI of drawing 7 (b) contains general information S_AVFI_GI of S_AVFI, search pointer S_VOIGI_SRP#1 - #n of still picture VOB group information, and still picture VOB group information S_VOIGI#1 - #n, as shown in drawing 7 (c).

[0103] S_VOIGI of drawing 7 (c) consists of a still picture VOB group's general information S_VOG_GI, and VOB entry S_VOB_ENT#1-#n for one or more still pictures, as shown in drawing 7 (d). There are four kinds (Type A - Type D) of each S_VOB_ENT.

[0104] Drawing 8 is drawing explaining the content of still picture video object entry S_VOB_ENT (Type A) contained in the still picture management information (S_VOIGI) of drawing 7 (d). S_VOB_ENT of Type A includes the information (S_VOB_ENT_TY) which shows the format of the VOB entry of a still picture, and the information (V_PART_SZ) which expressed the size of the video PART in a still picture VOB per sector.

[0105] Drawing 9 is drawing explaining the content of still picture video object entry S_VOB_ENT (Type B) contained in the still picture management information (S_VOIGI) of drawing 7 (d). S_VOB_ENT of Type B includes the information (A_PART_SZ) which expressed the size of the original Audie OPART in a still picture VOB (original copy) other than S_VOB_ENT_TY of Type A, and V_PART_SZ per sector, and the information (A_PB_TM) which expressed the playback time amount of this Audie OPART per video field.

[0106] In addition, when the playback time amount of actual Audie OPART is not in agreement with the boundary of the video field, a part to overflow the video field among the tail data of Audie OPART is omitted.

[0107] Drawing 10 is drawing explaining the content of still picture video object entry S_VOB_ENT (Type C) contained in the still picture management information (S_VOIGI) of drawing 7 (d). S_VOB_ENT of Type C includes an addition audio group's number information (S_AAGN) included in the audio stream added to the still picture VOB other than S_VOB_ENT_TY of Type A, and V_PART_SZ, and the information (AA_ENTN) on the entry number corresponding to the addition audio stream for these still pictures VOB.

[0108] Drawing 11 is drawing explaining the content of still picture video object entry S_VOB_ENT (Type D) contained in the still picture management information (S_VOIGI) of drawing 7 (d). S_VOB_ENT of Type D contains S_AAGN and AA_ENTN of Type C other than S_VOB_ENT_TY of Type B, V_PART_SZ, A_PART_SZ, and A_PB_TM.

[0109] Type A - Type D of above-mentioned S_VOB_ENT all contain S_VOB_ENT_TY and V_PART_SZ of Type A in common.

[0110] Drawing 12 is drawing explaining the content of still picture video object group general information S_VOG_GI contained in the still picture management information (S_VOIGI) of drawing 7 (d).

[0111] This S_VOG_GI includes the number (S_VOB_Ns) of the still pictures VOB registered into Relevance VOG, the still picture VOB stream information number (S_VOB_STIN), the hour entry (FIRST_VOB_REC_TM) when VOB of the beginning in this VOB group is recorded, the hour entry (LAST_VOB_REC_TM) when VOB of the last in this VOB group is recorded, and the starting address (S_VOG_SA) of this VOB group in a still picture AF file. This S_VOG_SA expresses the relative address from the head of S_AVFI per sector.

[0112] Drawing 13 is drawing explaining the content of still picture video object stream information

S_VOB_STI contained in the still picture management information (S_AVFIT) of drawing 7 (b). A format of the stream information STI updated in the equipment of drawing 1 is shown in drawing 13.

[0113] That is, this S_VOB_STI contains video attribute information V_ATR which described the video encoding method of an applicable still picture, audio attribute information OA_ATR which described the audio encoding method (or attribute of an original copy audio stream) of an option, subimage attribute information SP_ATR which described the encoding method of a subimage, and SP_PLT which described the color palette data of a subimage.

[0114] Drawing 14 is flow chart drawing explaining the overall image transcription procedure by the equipment of drawing 1. Hereafter, the processing at the time of the usual still picture image transcription is explained according to the flow of drawing 14.

[0115] First, the data of a file system are read from a disk 100 (step ST 100), and the availability of the disk is checked (step ST 102). When there is no availability, the alarm display "there is no image transcription tooth space" is outputted to a display (no [step ST102]) 608 and/or TV637, and image transcription processing is ended.

[0116] (Step ST102 Yes), when an availability is in a disk 100, image transcription pretreatment is performed (step ST 110). In this pretreatment, the writing (incorporation and creation of a VMG file) and others of a management domain are performed.

[0117] Next, it is confirmed whether the still mode in which a still picture is incorporated by the user from the key input section 607 etc. is set up (step ST 112). If still mode is not set up (no [step ST112]), a return is carried out to processing of the motion-video image transcription by movie mode etc.

[0118] If still mode is set up (step ST112 yes), a user will be made to set up the existence of voice record and will be made to set up chart lasting time further (step ST 114). When you have no voice record, a user is made to set up still time amount (step ST 114). Furthermore the STC section 650 is reset and initial setting of each encoding sections 616-618 is performed (step ST 114).

[0119] Here, when VMG is recorded on the disk 100, STI suitable for the attribute of hope is chosen from the stream information STI, and the value of selected STI is set to each encoding sections 616-618 (step ST 114).

[0120] When VMG is not recorded on a disk 100, the equipment (MPU section 604) of drawing 1 generates VMG, and you may register with a STI table. Not only the case of still picture record playback but in animation processing, this processing is performed. However, in the flow of drawing 14, this VMG registration (writing) processing is performed at the time of image transcription termination.

[0121] Next, it is confirmed whether the image transcription key / the REC key (it is equivalent to the shutter release of a function top camera) prepared in the key input section 607 or the remote controller which is not illustrated of drawing 1 were inputted (step ST 116).

[0122] When there is an input of an image transcription key / the REC key (step ST116 yes), image transcription initiation setting out is made (step ST 118). In this setting out, the image transcription instruction for one picture (one still picture) is set as the video encoding section 616, and, in with voice record, that sound recording time amount and a sound recording initiation instruction are set as the audio encoding section 617 (step ST 118).

[0123] In this way, the still picture with which the still picture video signal for one picture was incorporated by the encoder section 601, and was incorporated is compressed and pack-ized, and is recorded on a disk 100. When voice record is specified at this time, voice incorporated by the encoder section 601 is also compressed and pack-ized, and it is recorded on a disk 100. In this way, the record address of the still picture and voice which were pack-ized is determined with reference to a file system (step ST 120).

[0124] In this step ST 120, it writes in besides the write-in address, and size is also determined and the MPU section 604 publishes a write-in instruction in the disk drive section 609 based on the address and size which were determined. With this instruction issuance, the MPU section 604 creates VOG information (S_VOGI of drawing 7 (d)) (step ST 120). Grouping of the still picture of the specified number of sheets (S_VOB_Ns of drawing 12) etc. is performed by this created VOG information.

[0125] In addition, when there is no input of said the image transcription key / REC key (no [step ST116]), processing of a step ST 118 and a step ST 120 is skipped.

[0126] Next, it is confirmed whether the image transcription processing end key / the STOP key prepared in the key input section 607 or the remote controller which is not illustrated of drawing 1 were pressed (step ST 122).

[0127] If there is no input of an image transcription processing end key / the STOP key (no [step ST122]), the check of whether there is any remaining capacity which can be recorded on videotape on a disk 100 will be performed (step ST 132).

[0128] If it remains in a disk 100 and there is capacity (no [step ST132]), it will return to a step ST 116 and processing of steps ST118-ST120 will be repeated.

[0129] If it remains in a disk 100 and there is no capacity (step ST132 yes), the alarm display "there is no image transcription tooth space" will be outputted to a display 608 and/or TV637 (step ST 134), and it will shift to an image transcription post process (step ST 140).

[0130] In addition, when there is an input of said the image transcription processing end key / STOP key (step ST122 yes), processing of a step ST 132 and a step ST 134 is skipped, and shifts to an image transcription post process (step ST 140).

[0131] In the image transcription post process of a step ST 140, a VMG file is terminated, and a VMG file and a video file are registered into a file system, and are updated.

[0132] In this image transcription post process, S_AVFIT (VOG information S_VOGL is included) and PGCI are completed from carving information etc., and, specifically, it investigates whether the stream information STI used for the image transcription is in the video manager information VMGI. When this STI is not in VMGI, STI used for the image transcription is registered into VMGI. When this STI is in VMGI, the STI number used for the image transcription is registered into S_VOGL. And the formatter section 619 of drawing 1 is initialized and the writing of PGCI, carving information, etc. is performed after an appropriate time to VMG (step ST 140).

[0133] Drawing 15 is flow chart drawing explaining the content of image transcription pretreatment (step ST 110) in the procedure of drawing 14. Hereafter, pretreatment at the time of image transcription initiation is explained according to the flow of drawing 15.

[0134] First, a file system is checked from the volume structure of a disk 100 (step ST 1100). (Step ST1100 No), when the volume structure is not recorded on a disk 100, a file system is built (step ST 1102) and a DVD-RTR directory as shown in drawing 2 is created (step ST 1104).

[0135] (Step ST1100 Yes), when the volume structure is recorded on the disk 100, a DVD-RTR directory is checked (step ST 1106). (Step ST1106 No), when there is no DVD-RTR directory, a DVD-RTR directory is created (step ST 1108).

[0136] When there is a DVD-RTR directory (step ST1106 yes), or when a DVD-RTR directory is created (steps ST1104 or ST1108), the check of whether the error occurred in the file system read from the disk 100 is performed (step ST 1110).

[0137] (Step ST1110 Yes), when an error occurs, it expresses "the error occurred with the file system" etc. as the display 608 and/or TV637 of drawing 1 (step ST 1112), and processing is ended, or a return is carried out to error restoration (or restart of system) processing etc.

[0138] If an error does not occur (no [step ST1110]), it is confirmed whether management information VMG is in a disk 100 (step ST 1114).

[0139] VMG will be created if there is no VMG (no [step ST1114]) (step ST 1116). Although VMG created at this time may be recorded on the management file (VR_MANGR.IFO) of a disk 100, it does not only have to presuppose that it is to develop to work-piece RAM604a of the Main MPU section 604 of drawing 1, and it is not necessary to record it on a disk 100. In that case, what is necessary is just to save VMG of the content updated in the form where the content of an image transcription was made to reflect at the time of image transcription termination at the management file (VR_MANGR.IFO) of a disk 100.

[0140] If VMG is in a disk 100 (step ST1114 yes), the VMG will be read into work-piece RAM604a of the Main MPU section 604 from a disk 100 (step ST 1118).

[0141] If an error does not occur here (no [step ST1120]), a return is carried out to the step ST 112 of drawing 14 . If an error occurs (step ST1120 yes), it will express "creation of management data was not completed" etc. as a display 608 and/or TV637 (step ST 1122), and processing will be ended, or a return will be carried out to error restoration (or restart of system) processing etc.

[0142] The timing which performs image transcription pretreatment of drawing 15 can consider three kinds of timing as follows.

[0143] When the disk drive section 609 of drawing 1 is loaded with a disk 100 the first, it is the approach of performing promptly. Although there is an advantage that an image transcription can be started immediately, by this approach after pressing an image transcription key / the REC key, when it loads with a disk 100, the setup time will cut in some [many].

[0144] The second is the approach of performing, when the format carbon button which the key input section 607 does not illustrate is pushed. This approach has before record the fault that a format key must be pressed.

[0145] The third is the approach of carrying out at the time of image transcription initiation. Since some time lag arises to image transcription initiation in case of this approach after pressing an image transcription key / the REC key, it is necessary to save record data in the meantime in the memory section 611.

[0146] Drawing 16 is flow chart drawing explaining the content of the VOG information creation processing (step ST 120) in the procedure of drawing 14 .

[0147] First, there are the number of packs of the recorded still picture VOB, the number of packs of an audio, the playback time amount of an audio, and a subimage SP, those without /etc. are carved, and it incorporates as information, and registers with VOB_ENT of drawing 8 - drawing 11 (step ST 1200).

[0148] Next, the conditions of VOG-izing of two or more still pictures are checked (step ST 1202).

The :conditions 1 which have the following (independent or two or more combination) as this VOG-ized condition: It is whether the record number of sheets of a still picture reached fixed numbers (for example, 64 sheets).;

condition 2: -- when the date (time amount) of record was set up, or the date (time amount) changed (or was regular time amount reached?) -- how -- it is --;

Conditions 3: ***** [having pressed the change key (grouping key) of VOG which a user does not illustrate manually];

Conditions 4: The still picture recording mode was changed, or (did the source attribute of a still picture change?) they are how,;, etc.

[0149] If it corresponds to any one or more [of the above-mentioned conditions 1-4] (condition relevance of a step ST 1202), various information (the number of the still pictures VOB registered into applicable S_VOG, the number of the stream information STI which is in agreement with the attribute information on VOG, recording start time amount of the first VOB, recording start time amount of the last VOB, etc.) will be registered into S_VOG_GI of closing and drawing 12 for the VOG (step ST 1204).

[0150] If it corresponds to neither of the above-mentioned conditions 1-4 (un-corresponding [of a step ST 1202]), processing of a step ST 1204 is skipped.

[0151] Drawing 17 is flow chart drawing explaining the content of the image transcription after treatment (step ST 140) in the procedure of drawing 14 . This processing is performed in common with an animation/still picture.

[0152] First, the Main MPU section 604 updates VMG in work-piece RAM604a based on the carving information received from the formatter section 619 (step ST 1400).

[0153] Next, it is confirmed whether the attribute data used for the image transcription is shown in the table of the stream information STI in VMG (step ST 1402). (Step ST1402 Yes), when attribute data exists in a STI table, the STI number is registered into M_VOBI (in the case of an animation), or S_VOBI (in the case of a still picture) (step ST 1404).

[0154] (Step ST1402 No), when attribute data does not exist in a STI table, it checks to see the number of STI currently recorded has reached maximum (that is, is an opening shown in a STI table or not?) (step

ST 1406). (Step ST1406 No), when the number of STI has not reached maximum (that is, an opening is shown in a STI table), the STI information used for the image transcription is registered into a STI table, and the number of the STI registered newly is further registered into M_VOBI (in the case of an animation), or S_VOIGI (in the case of a still picture) (step ST 1408).

[0155] (Step ST1406 Yes), when the number of STI has reached maximum (that is, there is no opening in a STI table), M_VOBI (in the case of an animation) or S_VOIGI (in the case of a still picture) registered is investigated, and it is confirmed whether there is STI which is not used (step ST 1410). (Step ST1410 Yes), when there is intact STI, registration of intact STI information is erased, new STI is secured, the STI information used for the image transcription is registered into the place of the secured STI (step ST 1412), and it shifts to a step ST 1408. At a step ST 1408, the number of STI registered at a step ST 1412 is registered.

[0156] (Step ST1410 No), when there is no intact STI, the display 608 and/or TV637 of drawing 1 perform an error message, and error termination of the processing of drawing 17 (step ST 1414) is carried out.

[0157] If a STI number is registered into M_VOBI (in the case of an animation), or S_VOIGI (in the case of a still picture) (steps ST1404 or ST1408), it will be confirmed whether a VRO file (VOBS file) exists in the directory record information under the DVD_RTAV directory in a file system (drawing 2) (step ST 1416).

[0158] (Step ST1416 Yes), when a VRO file (VOBS file) exists, it is updating information on the VRO file (VOBS file) (to recorded information on a video file), and a directory record is updated (step ST 1418). (Step ST1416 No), when a VRO file (VOBS file) does not exist, additional (to recorded information on a video file) registration of the directory record information on a VRO file (VOBS file) is carried out (step ST 1420).

[0159] If updating (step ST 1418) or registration (step ST 1420) of directory record information ends, it will be confirmed whether a VR_MANGR.IFO file (VMG file) is in the directory record information under a DVD_RTAV directory (drawing 2) (step ST 1422).

[0160] When there is a VR_MANGR.IFO file (VMG file) (step ST1422 yes), the VMG information in work-piece RAM604a is written in the location of this IFO file, and the directory record information under a DVD_RTAV directory is updated (step ST 1424).

[0161] When there is no VR_MANGR.IFO file (VMG file) (no [step ST1422]), the information on VMG built in work-piece RAM604a is recorded on the free area of a disk 100, and additional registration of the information on an IFO file is carried out at the directory record information under a DVD_RTAV directory (step ST 1426).

[0162] In addition, processing about the stream information STI on drawing 17 can also be performed before an image transcription.

[0163] Drawing 18 - drawing 20 are flow chart drawings explaining the procedure of the still picture continuation incorporation image transcription by the equipment of drawing 1 .

[0164] First, the data of a file system are read from a disk 100 (step ST 200), and the availability of the disk is checked (step ST 202). When there is no availability, the alarm display "there is no image transcription tooth space" is outputted to a display (no [step ST202]) 608 and/or TV637, and image transcription processing is ended.

[0165] (Step ST202 Yes), when an availability is in a disk 100, image transcription pretreatment is performed (step ST 110). In this pretreatment, a VMG file is incorporated and each of those set points (PGCI, S_VOIGI, etc.) are saved at work-piece RAM section 604a of the Maine MPU section 604.

[0166] Next, it is confirmed whether the slide show incorporation mode in which two or more still pictures are continuously incorporated by the user from the key input section 607 etc. is set up (step ST 212). If slide show incorporation mode is not set up (no [step ST212]), a return is carried out to other processings.

[0167] If slide show incorporation mode is set up (step ST212 yes), a user will be made to set up the existence of voice record and voice chart lasting time will be made to set up further (step ST 214). (also

including no time amount restricting) When not carrying out voice record, a user is made to set up still time amount (step ST 214). Set-up the maximum sound recording time amount (or time amount unrestricted condition) or still time amount is saved at work-piece RAM section 604a. Furthermore the STC section 650 is reset and initial setting of each encoding sections 616-618 is performed (step ST 214). [0168] In this initial setting, a still picture recording mode (I picture still recording mode), VOG carving mode, voice chart lasting time, etc. are set up. Moreover, the stream information STI data in work-piece RAM section 604a are investigated, and if there are some which are in agreement with the attribute information on the data which should be recorded on videotape, the STI number is saved at work-piece RAM section 604a. When there is nothing that is in agreement with the attribute information on the data which should be recorded on videotape, the attribute information on this data that should be recorded on videotape is saved as STI at work-piece RAM section 604a.

[0169] Moreover, in initial setting of a step ST 214, a user is made to set up the image transcription time at the time of slide show photography, and while saving it at work-piece RAM section 604a, it is set as the formatter section 619 (step ST 214). In addition, when user setting out of image transcription time is not made, the incorporated time is set up.

[0170] Furthermore, a user is made to specify the incorporation initiation frame number after image change in initial setting of a step ST 214 (step ST 214). Although this incorporation initiation frame number specifies the image of what frame is incorporated after an image changes, when not specifying, it will incorporate the image frame of **** after change. (However, when the approach of detecting and incorporating the fixed frame number having continued after change is adopted) it is not necessary to make a user specify this frame number Making a user specify the frame number which points out the frame of what position is incorporated after image change here It is because when the electronic "still" camera etc. is performing slide show playback, and effect processing of fade-in, fade-out, etc. is being performed (in order to make it not incorporate the frame under fade-in or fade-out).

[0171] Detecting that a fixed number of same image frames continued after frame change detection instead of such frame number assignment, and incorporating frame data by making the detected signal into a trigger is also considered.

[0172] Then, the input check of the slide show incorporation initiation key (not shown) prepared in the key input section 607 or the remote controller which is not illustrated of drawing 1 is made (step ST 216).

[0173] When there is an initiation key input (step ST216 yes), image transcription initiation setting out is made to the encoder section 601 (step ST 218). In this setting out, when audio encoding is set up with setting out which encodes one frame (or 1 field) as an I picture, setting out which specifies no initiation [of audio encoding] and maximum sound recording time amount, or time amount restricting as the audio encoding section 617 is made.

[0174] After image transcription initiation setting out is made at a step ST 218, the input check (step ST 222) of an image transcription end key, a sound recording passage-of-time check (step ST 224), and the change check (step ST 226) of the content of an image are made.

[0175] When there is no input of an image transcription end key (no [step ST222]), it does not pass to the set-up maximum sound recording time amount (no [step ST224]) and change has not occurred in the content of an image, either (no [step ST226]), the encoding amount of data (amount of data compressed and pack-ized in the formatter section 619) till then has it confirmed by the buffer memory section 620 whether to be constant-rate ***** (step ST 228). (Step ST228 No), when the encoding amount of data collected on the buffer memory section 620 has not reached a constant rate, the processing loop formation of steps ST222-ST228 is repeated until it reaches a constant rate.

[0176] If the encoding amount of data collected on the buffer memory section 620 reaches a constant rate (step ST228 yes), the write-in address and data size of data (pack) of the constant rate will be determined by the file system, and it will be written in a disk 100 by the disk drive section 609 (step ST 230).

[0177] The check of whether at the time of this writing, there is any remaining capacity which can be recorded on videotape on a disk 100 is performed (step ST 232). If it remains in a disk 100 and there is capacity (no [step ST232]), it will return to a step ST 222 and processing of steps ST222-ST230 will be

repeated.

[0178] If it remains in a disk 100 and there is no capacity (step ST232 yes), there "there being no remaining capacity" or the alarm display "there is no image transcription tooth space" will be outputted to a display 608 and/or TV637 (step ST 234), and it will shift to the image transcription post process (step ST 140) of drawing 20 . (Step ST222 Yes), in addition, also when there is an input of an image transcription end key in a step ST 222, it shifts to the image transcription post process (step ST 140) of drawing 20 .

[0179] (Step ST226 Yes), when it passes to the maximum sound recording time amount set up in a step ST 224 (step ST224 yes), or when change arises by the content of an image in a step ST 226, it shifts to the step ST 220 of drawing 19 .

[0180] An encoding termination instruction is published by the audio encoding section 617 at a step ST 220. Then, reading appearance of the data encoded until now is carried out from the buffer memory section 620, and they are written in a disk 100 (the write-in address and data size, i.e., the non-recorded remaining amount of data, are determined by the file system). And the number of packs of VOB (drawing 3) etc. is saved as carving information (VOBI information) at work-piece RAM section 604a. Furthermore, when new grouping is needed with the still picture number-of-sheets upper limit attainment in 1 group, attribute change of a still picture, etc., a VOG part injury line crack and its VOG information (S_VOI) are created, and it is saved at work-piece RAM section 604a.

[0181] Then, it waits until the frame number specified further passes after change occurs in waiting and the content of an image until change of the content of an image breaks out (step ST236 yes) (step ST238 yes). After doing so, it will return to the step ST 218 of drawing 18 , and the still picture group of the incorporated slide show will be written in a disk 100 by the processing loop formation of steps ST222-ST232.

[0182] In addition, if it confirms whether the image frame of the same content carried out predetermined number continuation in a step ST 238 and the image frame of the same content carries out predetermined number continuation after detecting the content change of an image in a step ST 236 (step ST238 yes), it can also constitute so that it may return to the step ST 218 of drawing 18 .

[0183] In processing of drawing 18 , after the alarm display "there is no remaining capacity" is outputted when there is an image transcription end key input (step ST222 yes) or (step ST 234) and the image transcription post process (step ST 140) of drawing 20 is performed, processing of drawing 18 - drawing 20 is ended.

[0184] In this image transcription post process (step ST 140; equivalent to ST140 of drawing 14) * Carving information (S_VOI etc.) is constituted and it is investigated whether the stream information STI used for * image transcription is in VMG. When there is nothing, STI used for the image transcription is registered, in a certain case, an applicable STI number is registered into S_VOI, initialization of * formatter section 619 is performed, and the writing (renewal of VMG) to the VMG file of * image transcription information (PGCI setting out, carving information, etc.) is performed.

[0185] Processing of drawing 18 described above - drawing 20 can realize continuation incorporation of a still picture easily, without applying a troublesome actuation burden to a user.

[0186] Drawing 21 is flow chart drawing explaining the overall regeneration procedure by the equipment of drawing 1 .

[0187] First, the disk 100 with which the disk drive section 609 of drawing 1 was loaded is checked (step ST 300). When a disk 100 is faulty, or when it is the disk of specification which cannot respond by the system of drawing 1 , (NG of a step ST 300) and error processing are performed (step ST 302), and processing of drawing 21 is ended.

[0188] When a disk 100 is normal, it is confirmed whether the volume structure is recorded on (O.K. of a step ST 300) and its disk (step ST 304). (Step ST304 Yes), when the volume structure is recorded, existence of a DVD_RTR directory (drawing 2) is checked (step ST 306).

[0189] When there is no DVD_RTR directory (no [step ST306]), or when the volume structure is not recorded (no [step ST304]), after the message indicator of "not being recorded on videotape" is made

(step ST 308), processing of drawing 21 is ended.

[0190] (Step ST306 Yes), when there is a DVD_RTR directory, the existence of error generating is checked (step ST 310). When an error occurs, after the message indicator of "(Step ST310 Yes), the error occurred with the file system" is made (step ST 312), processing of drawing 21 is ended.

[0191] (Step ST310 No), when errorless, it is confirmed whether a VMG file is in a disk 100 (step ST 314). When there is a VMG file, the content of the (step ST314 yes) VMG file is read (step ST 318), and it is confirmed whether there are any VRO files, such as VR_MOVIE.VRO as shown there at drawing 2, VR_STILL.VRO, and VR_AUDIO.VRO, (step ST 320).

[0192] When there is no VRO file (no [step ST320]), or when there is no VMG file (no [step ST314]), after the message indicator of "not being recorded on videotape" is made (step ST 316), processing of drawing 21 is ended.

[0193] (Step ST320 Yes), when there is a VRO file, the program number and cel number which carry out playback initiation are chosen by the user etc., and are determined (step ST 322).

[0194] if the program number and cel number which carry out playback initiation are determined -- the video decoding section 628 of drawing 1, SP decoding section 627, and the audio decoding section 630 -- each initial setting is performed (step ST 324). In this initial setting, the video decoding section 628 is set as a still picture playback mode (still picture mode), disregards the STC section 650, and comes to perform I picture playback of MPEG video.

[0195] It goes into cel regeneration of a still picture etc. after that (step ST 330). The detail of this cel regeneration is later mentioned with reference to drawing 22 and drawing 23.

[0196] (Step ST332 No), while cel playback is continuing, from PGCI, the following playback cel is set up (step ST 334), and repetitive activation of the cel regeneration of a step ST 330 is carried out.

[0197] Termination of cel playback checks generating of an error (step ST 336). (step ST332 yes) If errorless (no [step ST336]), after processing at the time of other playback termination will be performed (step ST 338), processing of drawing 21 is ended. When there is an error, after the message indicator of "(Step ST336 Yes), the read-out error occurred" is made (step ST 340), a playback post process is performed (step ST 342), and a return is carried out to other manipulation routines.

[0198] Drawing 22 and drawing 23 are flow chart drawings explaining the concrete content of processing of the processing at the time of the cel playback in the procedure of drawing 21 (step ST 330).

[0199] In drawing 22, the starting position (FP) of the cel which it is going to reproduce is determined from the content of PGCI of drawing 4, and S_AVFIT of drawing 7 (step ST 3300). This location (FP) is expressed with a logical-block number (LBN).

[0200] In processing of this step ST 3300, the number of the video object VOB which starts playback is set as a parameter "n", the video object group's VOG stream information STI to reproduce is read into work-piece RAM section 604a, and they are set as each decoding sections 627-630.

[0201] Next, the temporary erasion flag which shows an elimination condition temporarily is taking lessons from VOB which it is going to reproduce, and it is checked whether the flag is turned on (step ST 3302). The condition of this temporary erasion flag-on is equivalent to the condition that the file of Relevance VOB was thrown away into the garbage can icon.

[0202] Although VOB of temporary erasion flag-on was not necessarily eliminated actually yet, it is removed for playback. If the temporary erasion flag of the present VOB is ON (step ST3302 yes), processing will jump to the step ST 3336 of drawing 23 mentioned later.

[0203] If the temporary erasion flag of current VOB is off (no [step ST3302]), the starting position (FP) of n-th VOB which it is going to reproduce will be determined from the content (stream information STI including the attribute information on the VOB number n, and video/audio to reproduce) of PGCI and S_AVFIT (step ST 3304).

[0204] Next, the judgment of which [of Type A of drawing 8 - drawing 11 - Type D] is entry type VOB_ENT of n-th determined VOB is performed (step ST 3310).

[0205] If VOB_ENT is Type A, from RTR_VMGI of drawing 4 (a), reading appearance of the information (STILL_TM) on the still time (still picture display time) which is not illustrated will be

carried out, it will be set up (step ST 3312), and a data read-out instruction will be set to the disk drive section 609 (step ST 3324).

[0206] If VOB_ENT is Type B, a still time will be set as 0xFFFF (audio playback time amount), and it will be set up so that the audio on which the still picture was overlapped may be reproduced (step ST 3314). And after the playback time stamp PTS of audio initiation is set as the STC section 650 (step ST 3322), a data read-out instruction is set to the disk drive section 609 (step ST 3324).

[0207] When VOB_ENT is Type C, a still time is set as 0xFFFF (audio playback time amount), and it is set up so that an ADISHONARU audio (addition audio AA) may be reproduced (step ST 3316). In that case, it is set up so that the transfer ending address of Relevance VOB may serve as only video PERT. Then, processing shifts to a step ST 3322.

[0208] When VOB_ENT is Type D, it is confirmed whether the ADISHONARU audio is chosen first (step ST 3318). If the ADISHONARU audio is chosen (step ST3318 yes), processing will shift to a step ST 3316. If the ADISHONARU audio is not chosen (no [step ST3318]), a still time will be set as 0xFFFF (audio playback time amount), and it will be set up so that the audio on which the still picture was overlapped may be reproduced (step ST 3320). Then, processing shifts to a step ST 3322.

[0209]

* NOTICES *

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- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.**** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

DRAWINGS

[Drawing 6]

C_EPI

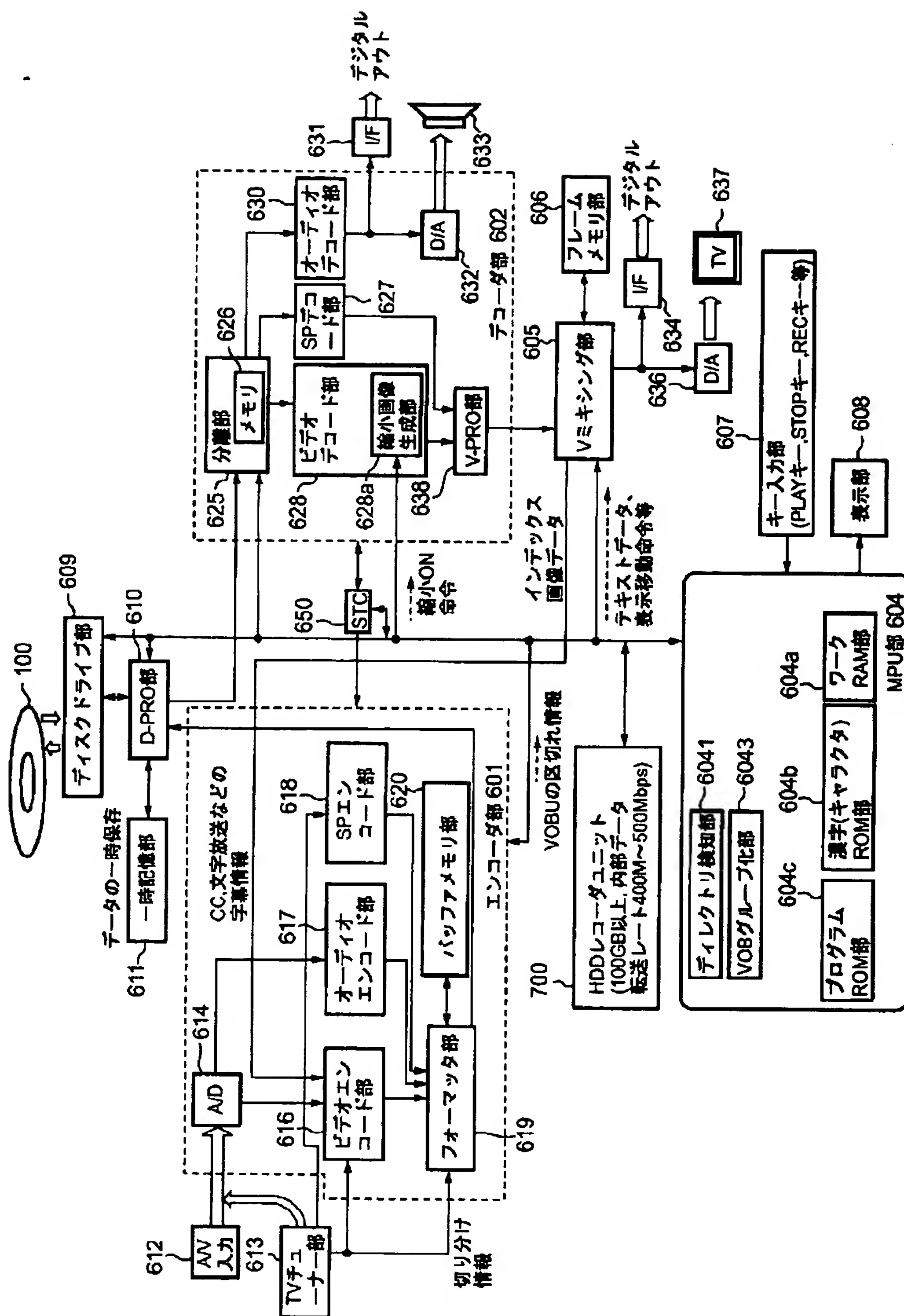
位置(RBP)	記号	内容	バイト数
0 to 0	EP_TY	EPタイプ 0:PRM_TXTIなし 1:PRM_TXTIあり	
1 to 6	S_S_VOB_ENTN	開始のS_VOBの番号	
7 to 134	PRM_TXTI	テキスト情報	
		合計	135

[Drawing 8]

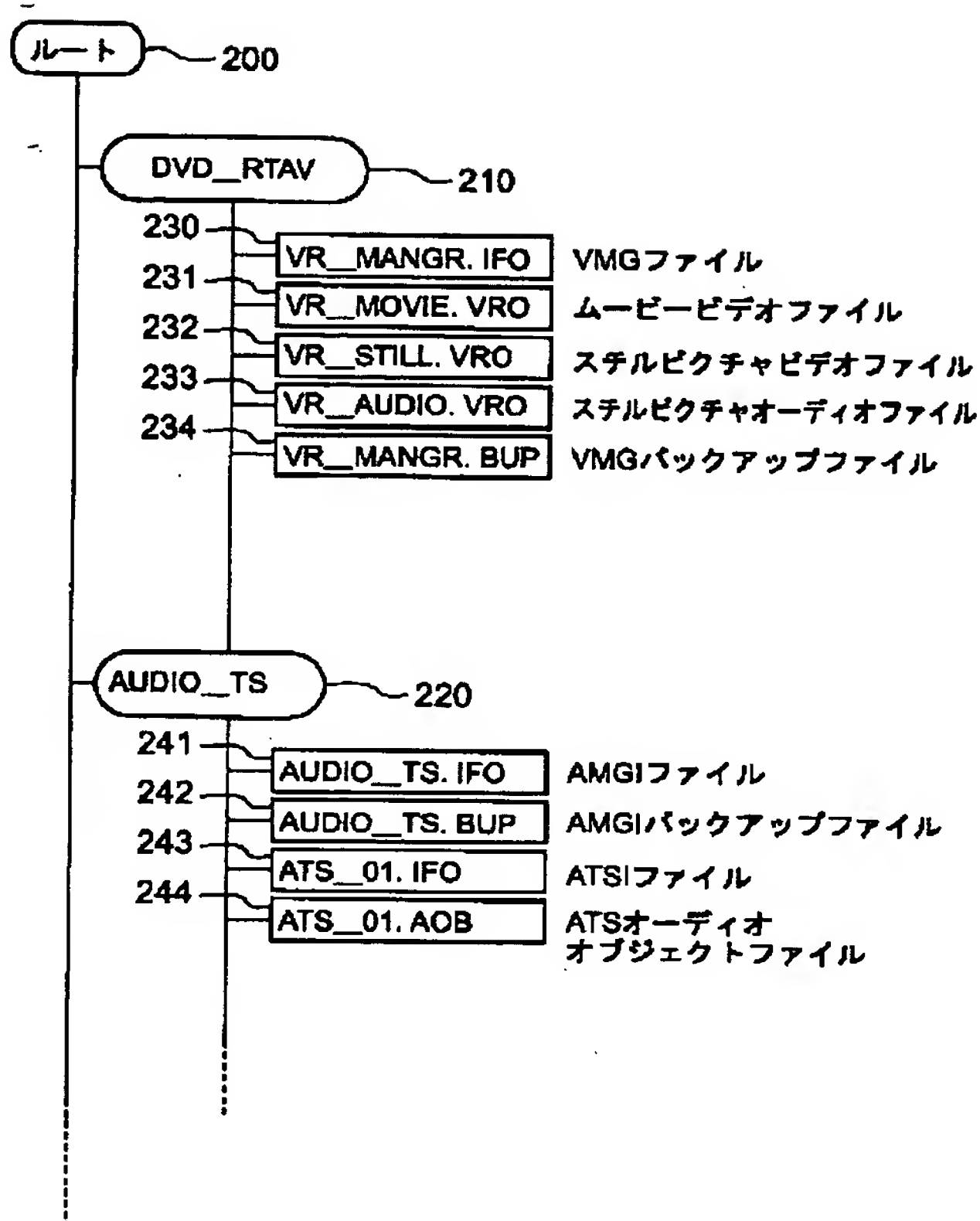
VOB_ENT(TYPE A)

位置(RBP)	記号	内容	バイト数
0 to 0	S_VOB_ENT_TY	b7~6:MAPタイプ (0) b0:SP有り/無し	
1 to 1	V_PART_SZ	ビデオパートのバック数	
		合計	2バイト

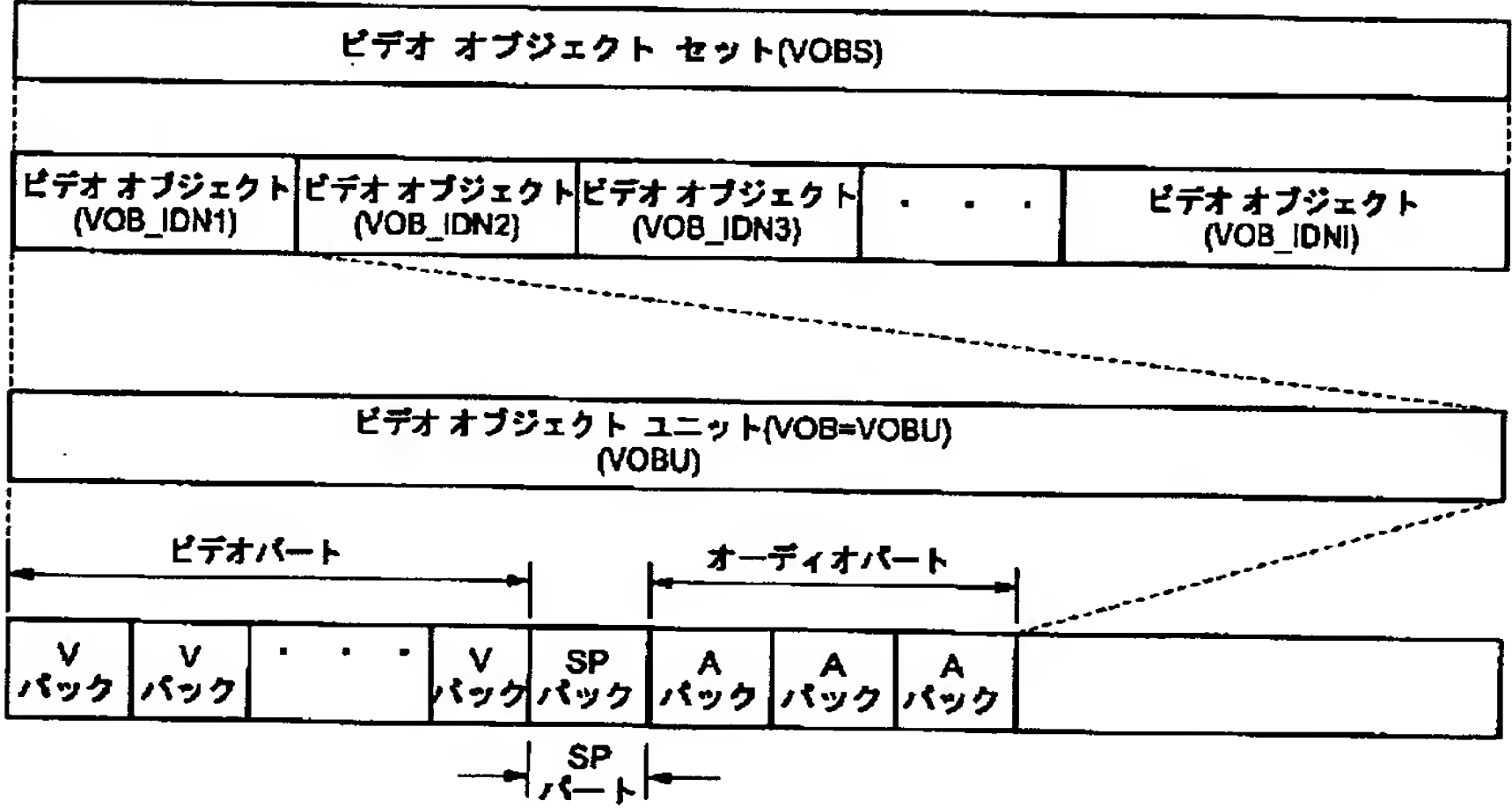
[Drawing 1]



[Drawing 2]



[Drawing 3]



[Drawing 5]

C_GI

位置(RBP)	記号	内容	バイト数
0 to 0	予約		
1 to 1	C_TY	セルタイプ 00:ムービーセル 20(h):スチル 画セル	
2 to 3	S_VOGI_SRPN	VOGIのサーチポイントの 番号	
4 to 5	C_EPI_Ns	エントリポイントの数	
6 to 11	S_S_VOB_ENTN	開始のS_VOBの番号	
12 to 17	E_S_VOB_ENTN	終了のS_VOBの番号	
		合計	18

[Drawing 9]

VOB_ENT(TYPE B)

位置(RBP)	記号	内容	バイト数
0 to 0	S_VOB_ENT_TY	b7~6:MAPタイプ (1) b0:SP有り/無し	
1 to 1	V_PART_SZ	ビデオパートのバック数	
2 to 3	A_PART_SZ	オーディオパートのバック数	
4 to 5	A_PB_TM	オーディオパートの再生時間	
		合計	6バイト

[Drawing 10]

VOB_ENT(TYPE C)

位置(RBP)	記号	内容	バイト数
0 to 0	S_VOB_ENT_TY	b7~6:MAPタイプ (2) b0:SP有り/無し	
1 to 1	V_PART_SZ	ビデオパートのバック数	
2 to 3	S_AAGIN	アディショナルオーディオのGI番号	
4 to 4	AA_ENTN	アディショナルオーディオのエントリ番号	
		合計	5バイト

[Drawing 13]

S_VOB_STI

位置(RBP)	記号	内容	バイト数
0 to 1	V_ATR	ビデオのエンコード方式の情報	
2 to 3	OA_ATR	オプションのオーディオのエンコード方式の情報	
4 to 5	SP_ATR	SPのエンコード方式の情報	
6 to 53	SP_PLT	SPのパレットデータ	
		合計	54バイト

[Drawing 4]

VMG

RTR_VMG
M_AVFIT
S_AVFIT
ORG_PGCI
UD_PGCIT
TXDT_MG
MNFIT

(a)

UD_PGCIT

UD_PGCITI
UD_PGC_SRP #1
⋮
UD_PGC_SRP #n
UD_PGCI #1
⋮
UD_PGCI_#M

(b)

(c)

PGCI
PGC_GI
PGCIT
CI_SRPT
CIT

CIT

CI #1
⋮
CI #j

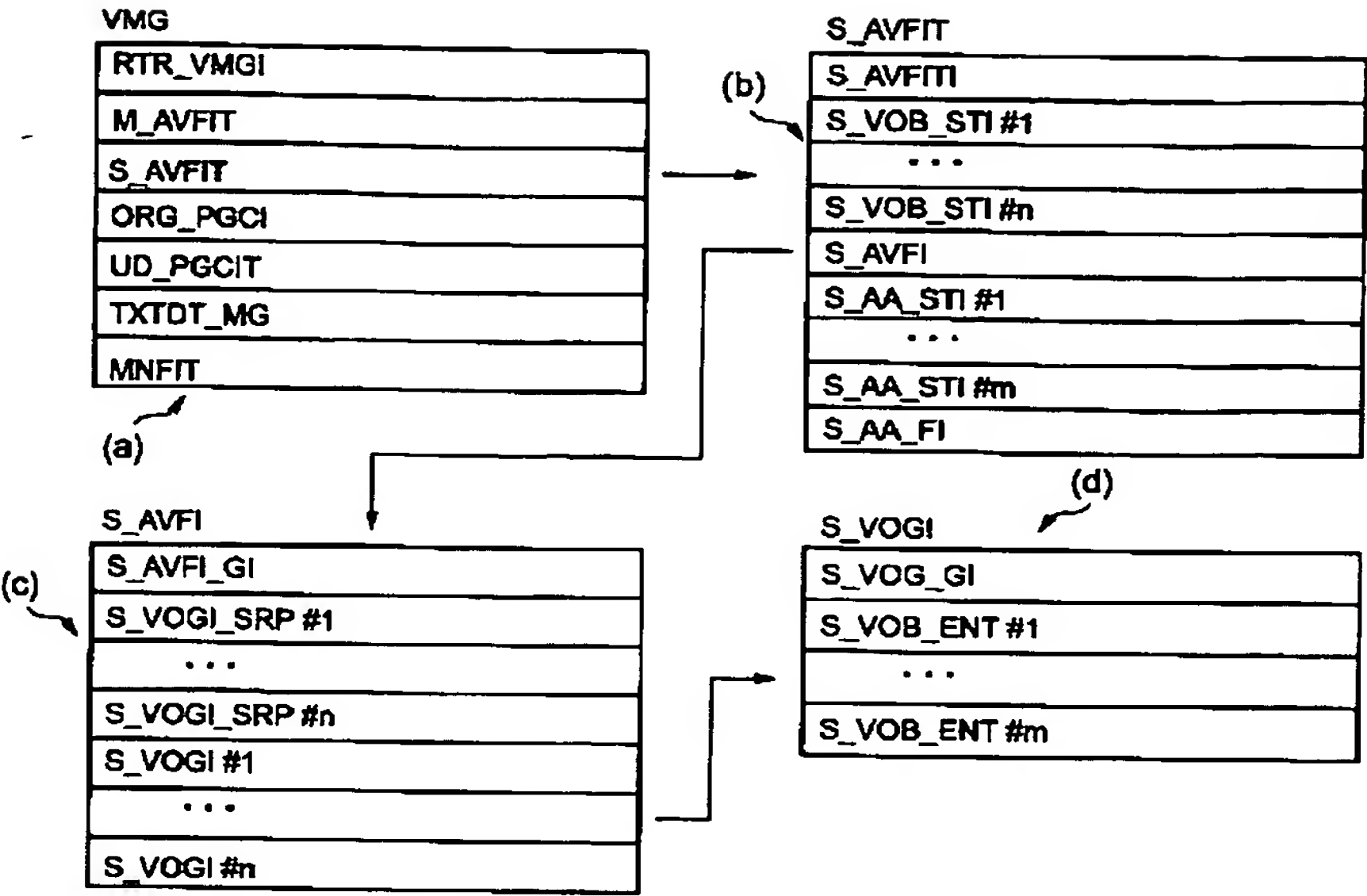
(d)

CI

C_GI
C_EPI #1
⋮
C_EPI #k

(e)

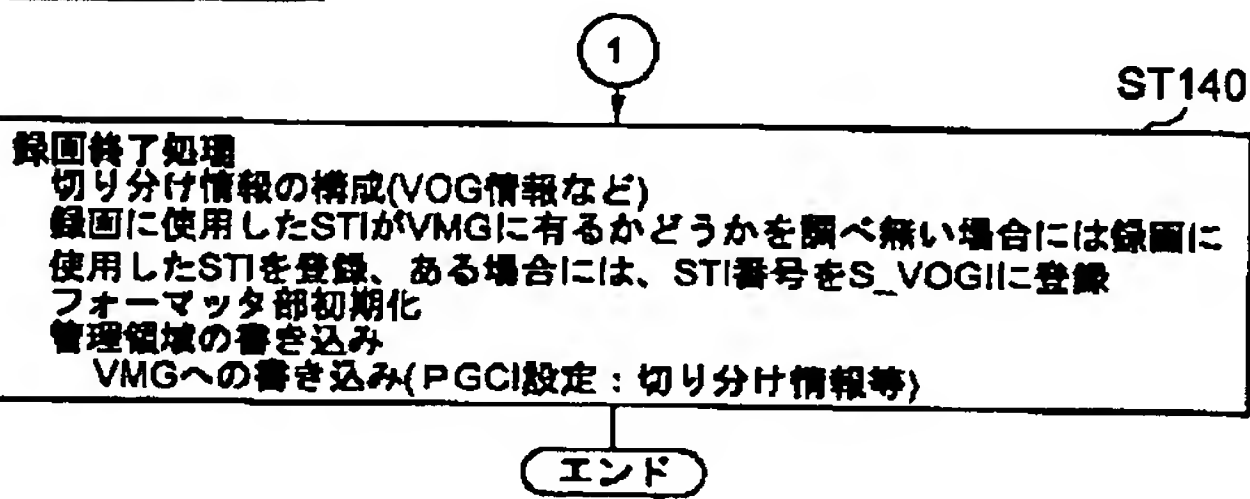
[Drawing 7]



[Drawing 12]

S_VOG_GI			
位置(RBP)	記号	内容	バイト数
0 to 0	S_VOB_NS	本VOGに登録されているVOBの数	
1 to 1	S_VOB_STIN	S_VOBの属性情報(STI)の番号	
2 to 6	FIRST_VOB_REC_TM	最初のVOBの記録開始時間	
7 to 11	LAST_VOB_REC_TM	最後のVOBの記録開始時間	
12 to 15	S_VOG_SA	本VOGのAVファイル内でのスタートアドレス	
		合計	16バイト

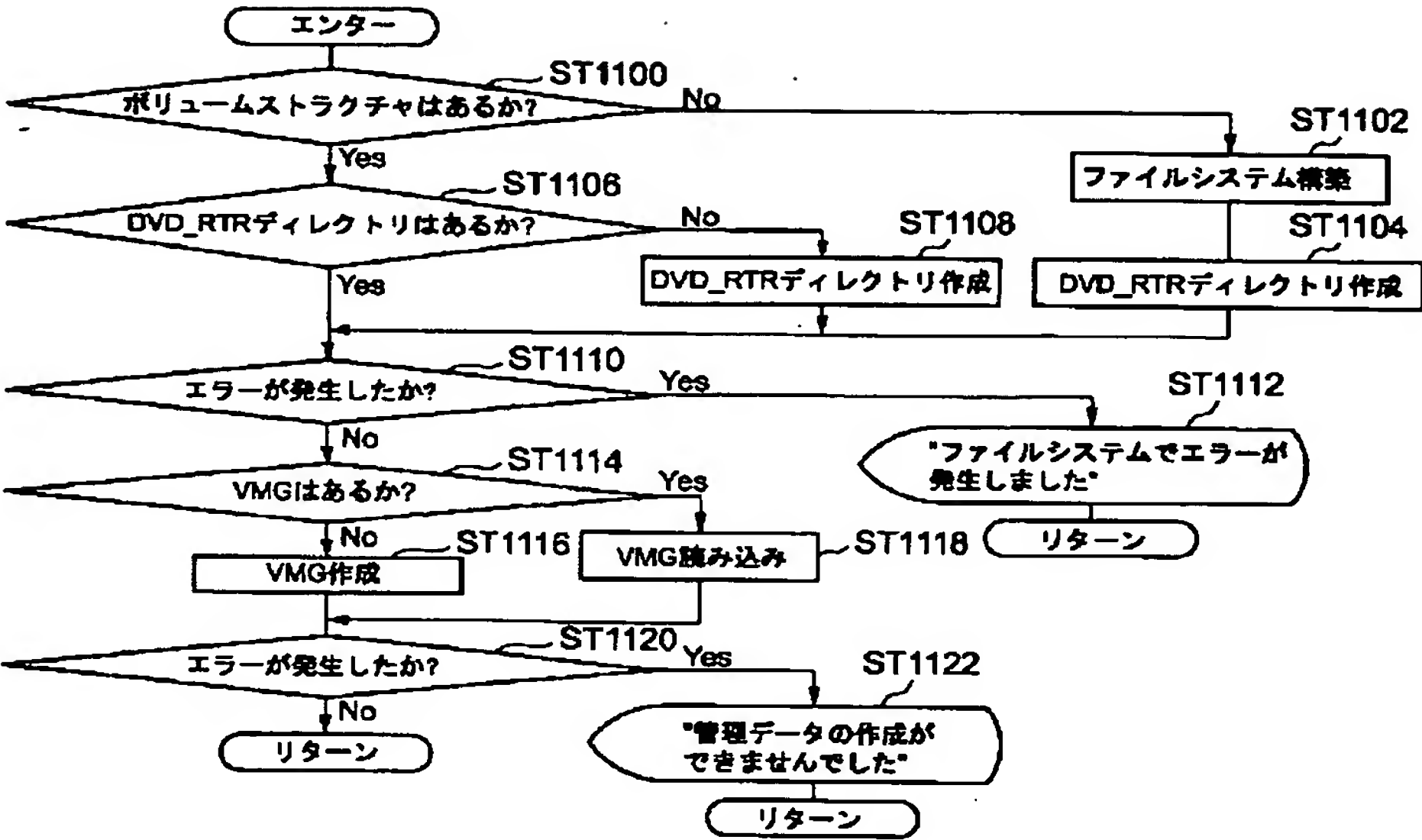
[Drawing 20]



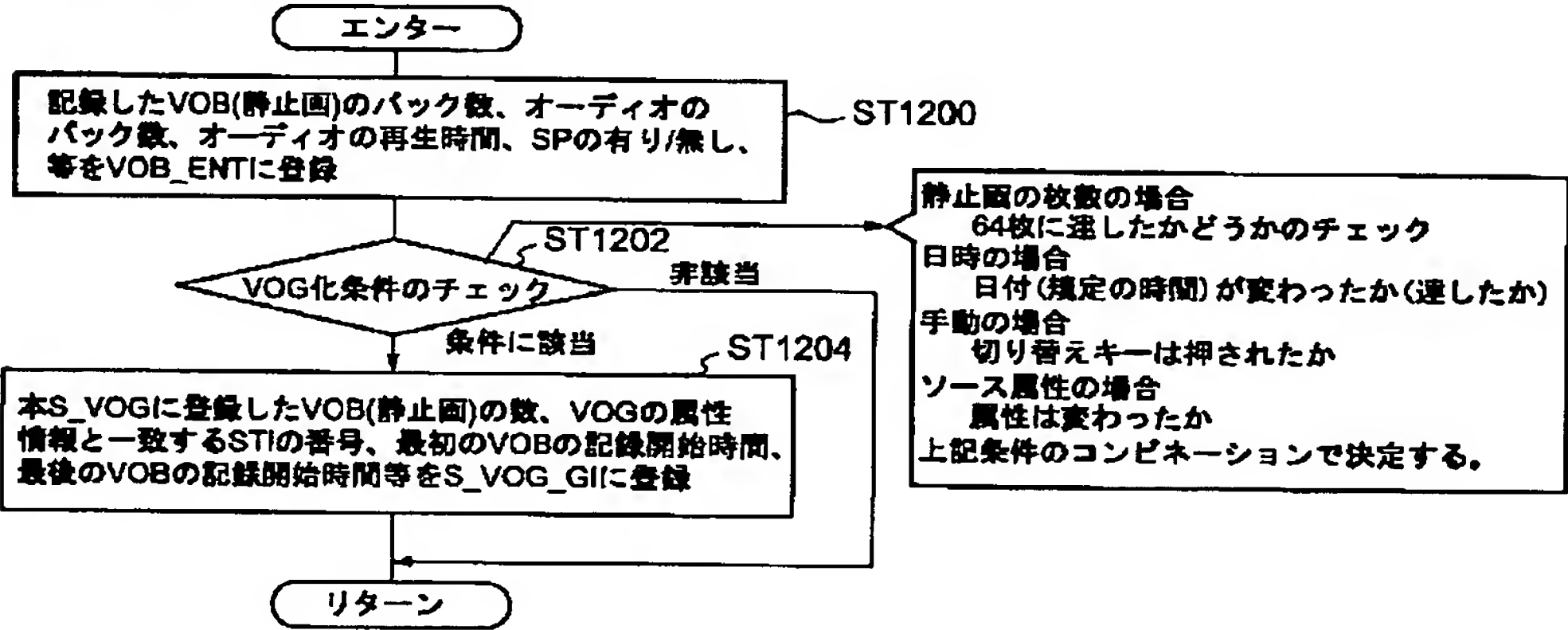
[Drawing 11]

VOB_ENT(TYPE D)			
位置(RBP)	記号	内容	バイト数
0 to 0	S_VOB_ENT_TY	b7~6:MAPタイプ (3) b0:SP有り/無し	
1 to 1	V_PART_SZ	ビデオパートのバック数	
2 to 3	A_PART_SZ	オーディオパートのバック数	
4 to 5	A_PB_TM	オーディオパートの再生時間	
6 to 7	S_AAGIN	アディショナルオーディオのGI番号	
8 to 8	AA_ENTN	アディショナルオーディオのエントリ番号	
		合計	9バイト

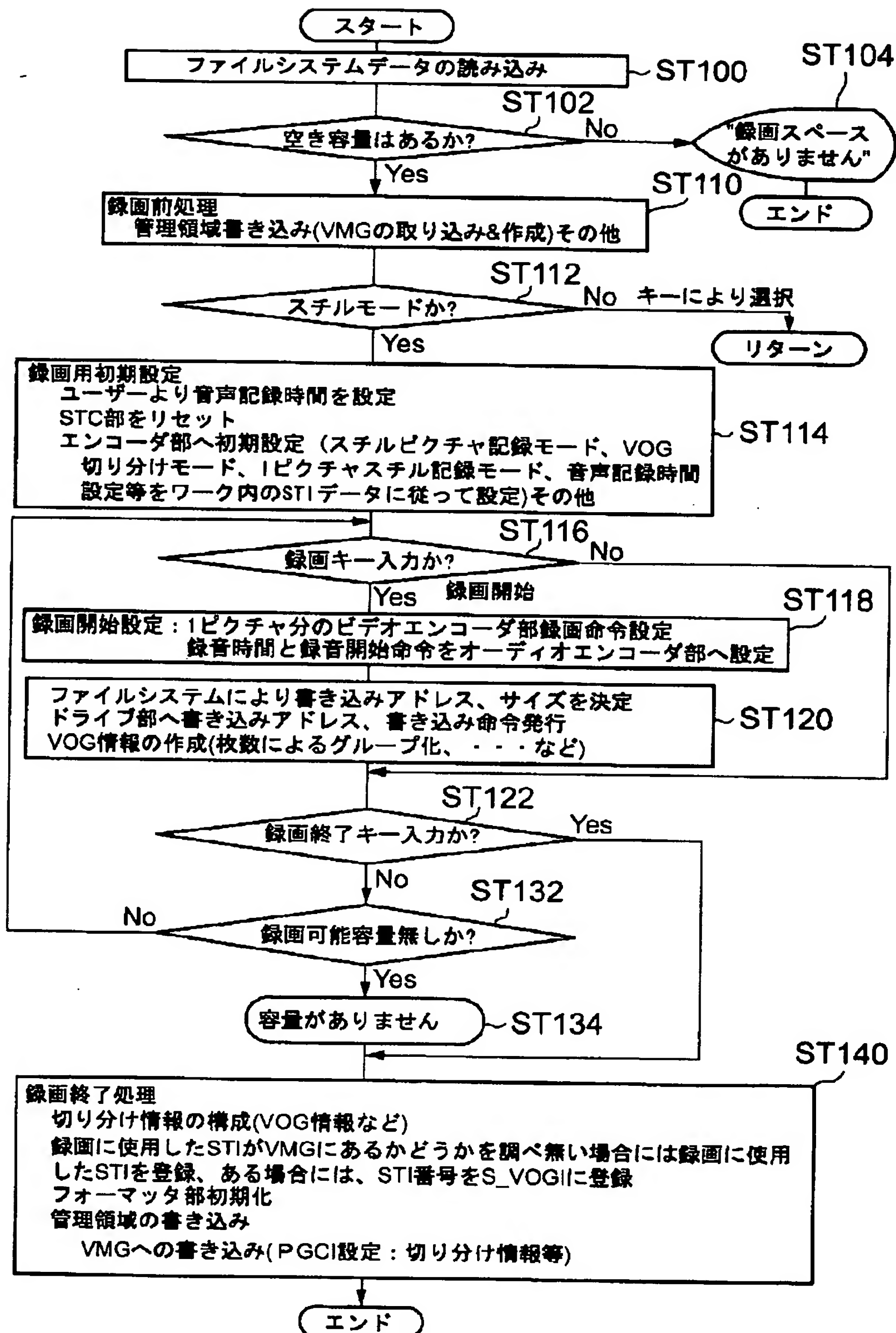
[Drawing 15]



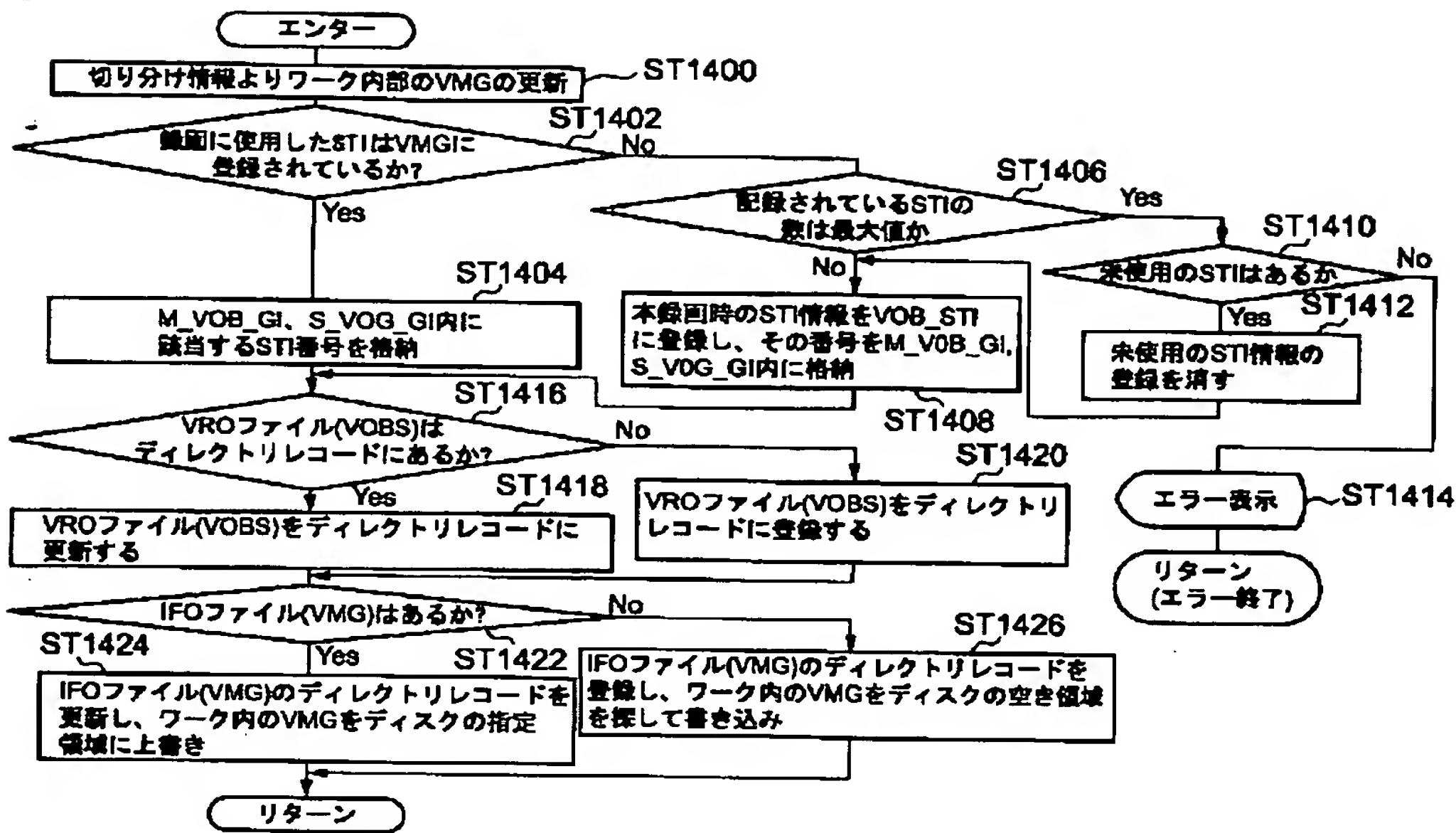
[Drawing 16]



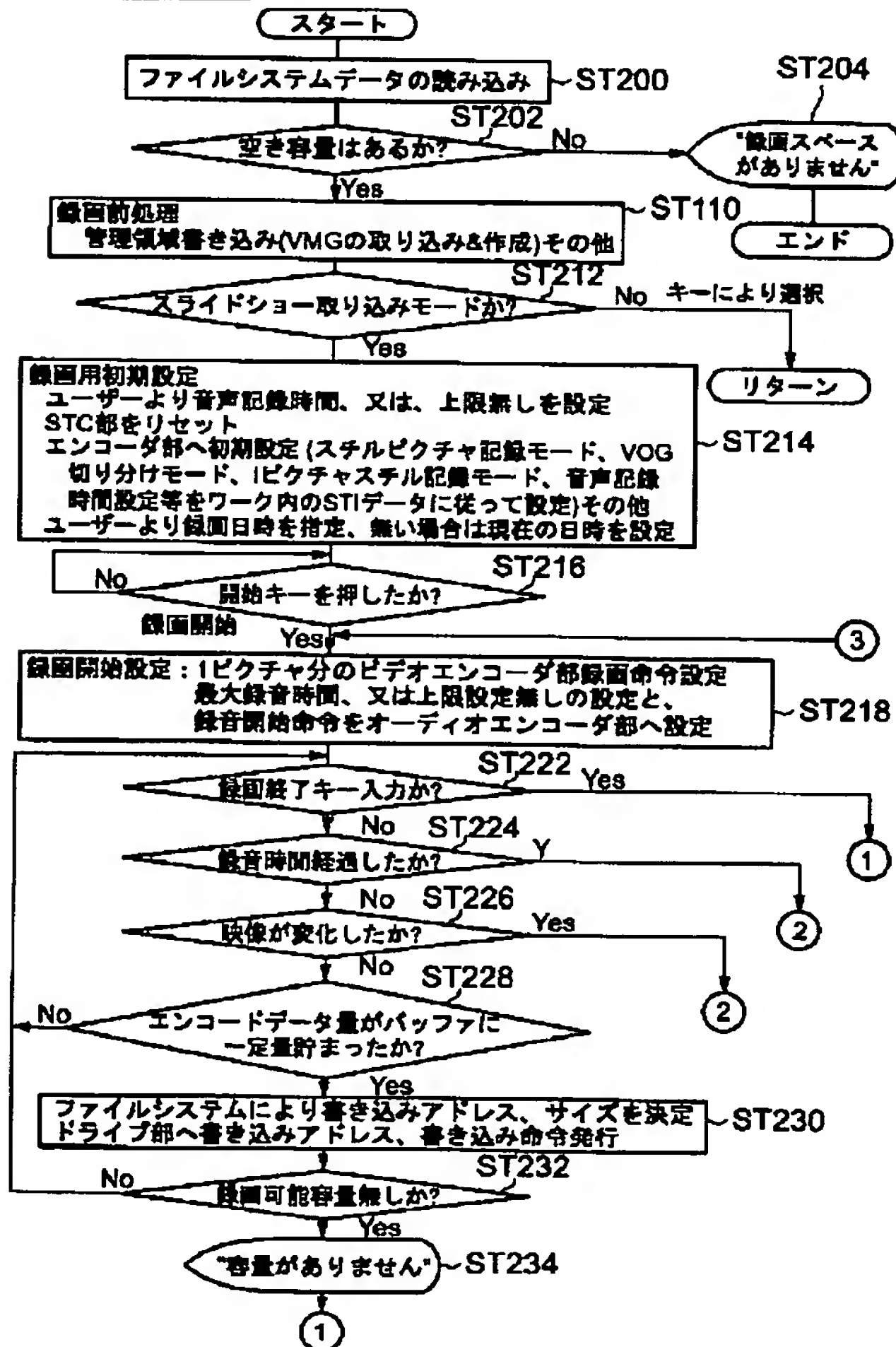
[Drawing 14]



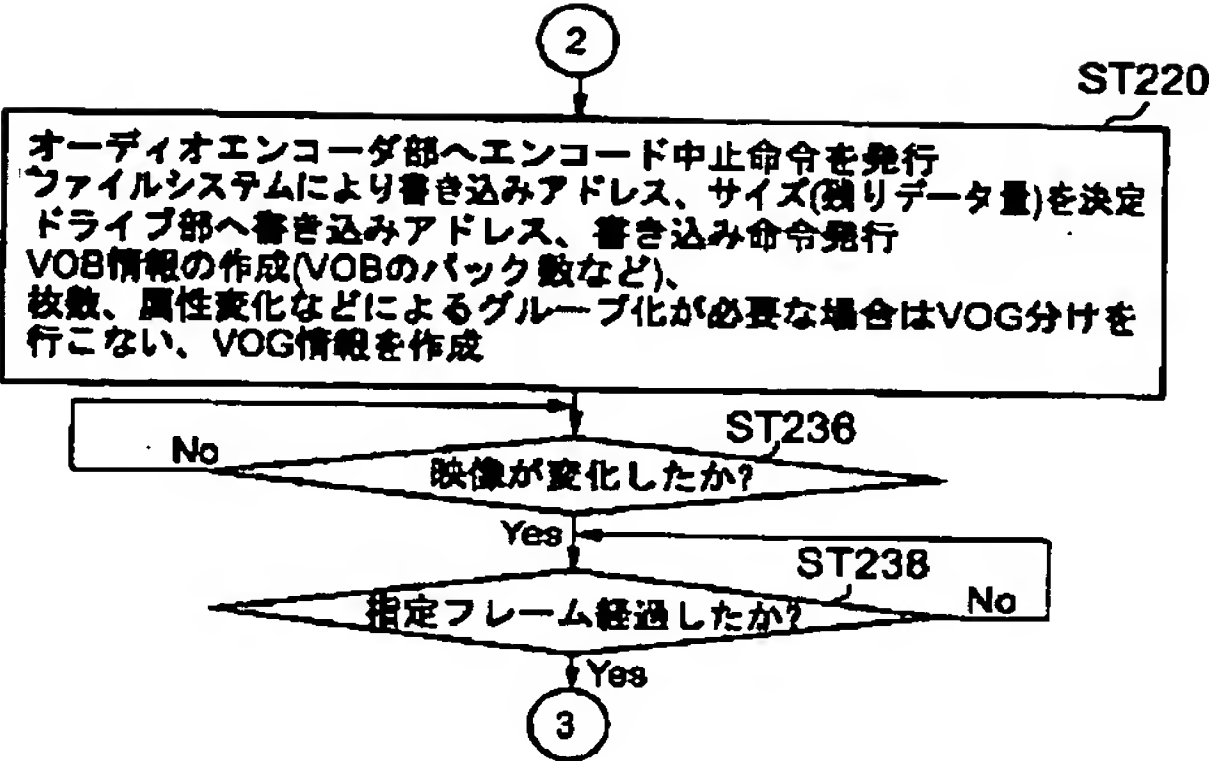
[Drawing 17]



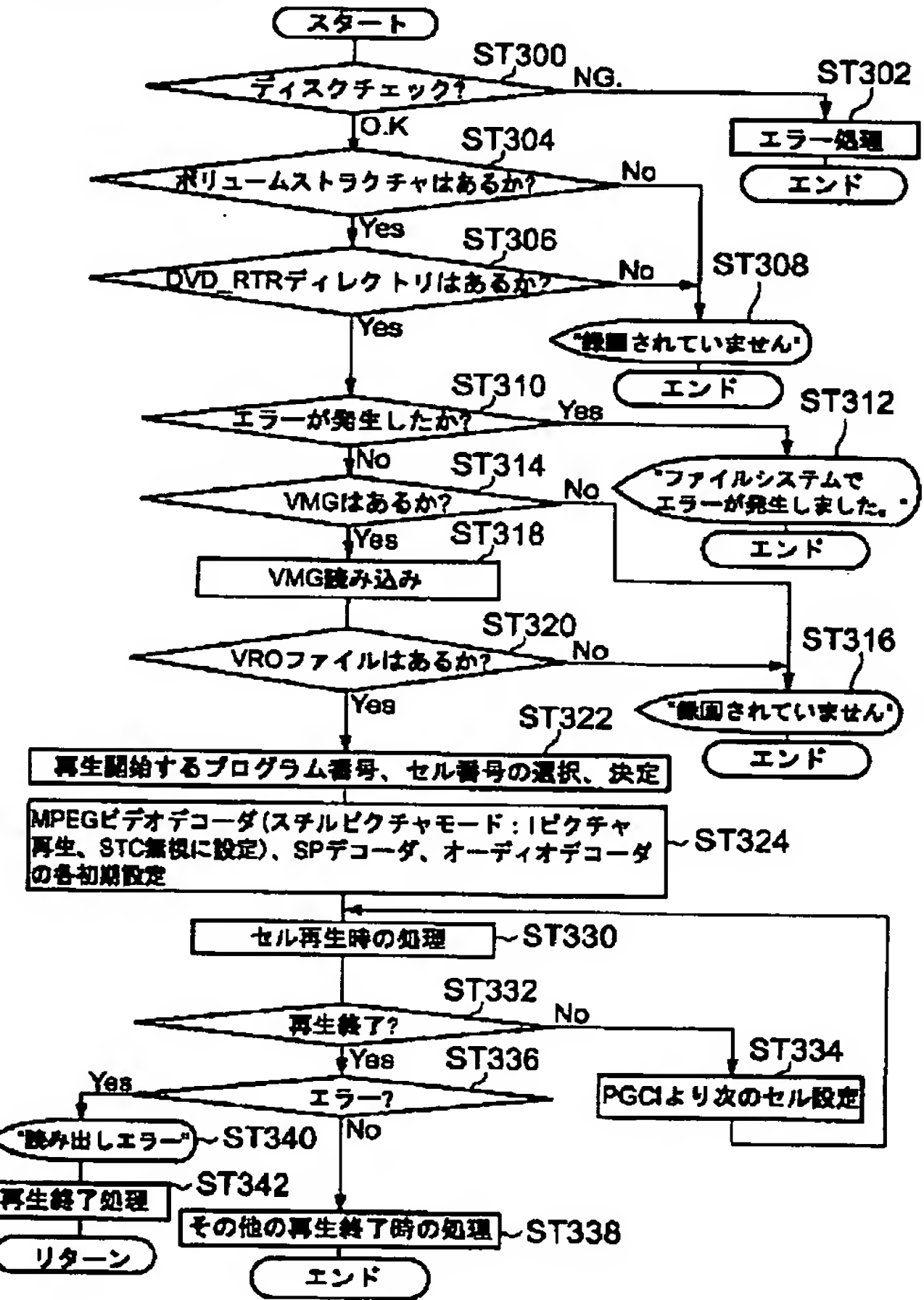
[Drawing 18]



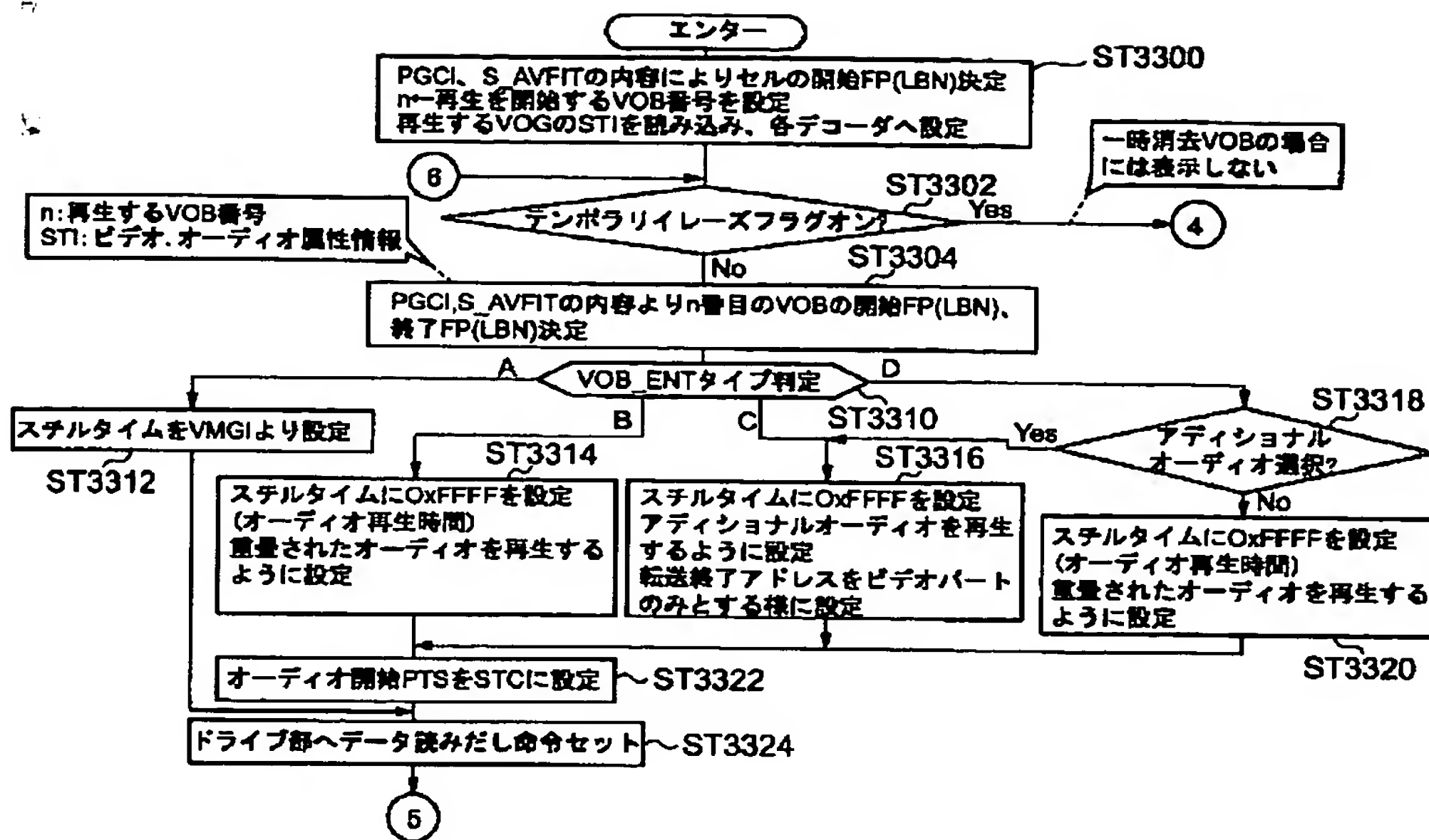
[Drawing 19]



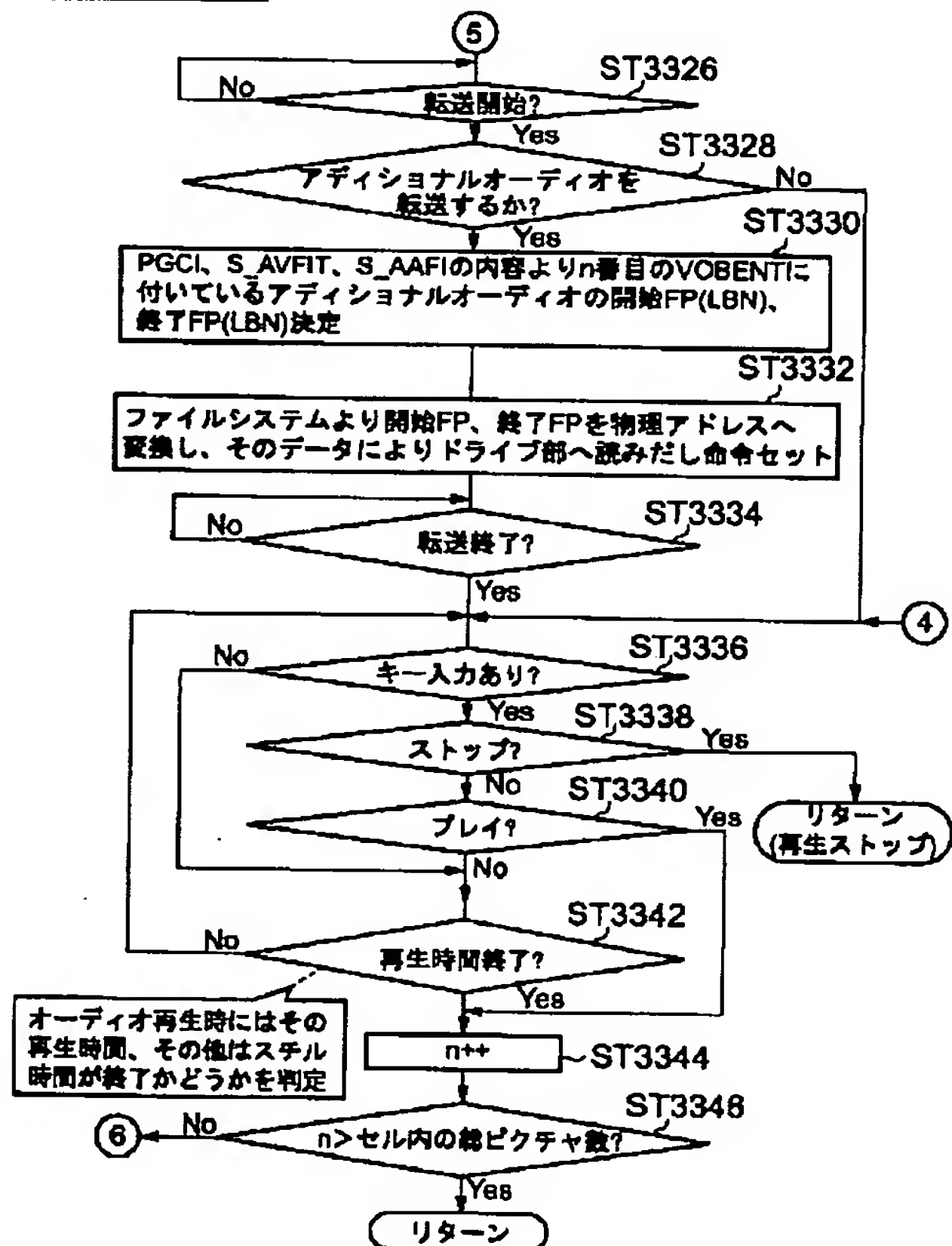
[Drawing 21]



[Drawing 22]



[Drawing 23]



[Translation done.]